

# BLUE IMMEDIAL COLOURS

CASSELLA COLOR COMPANY

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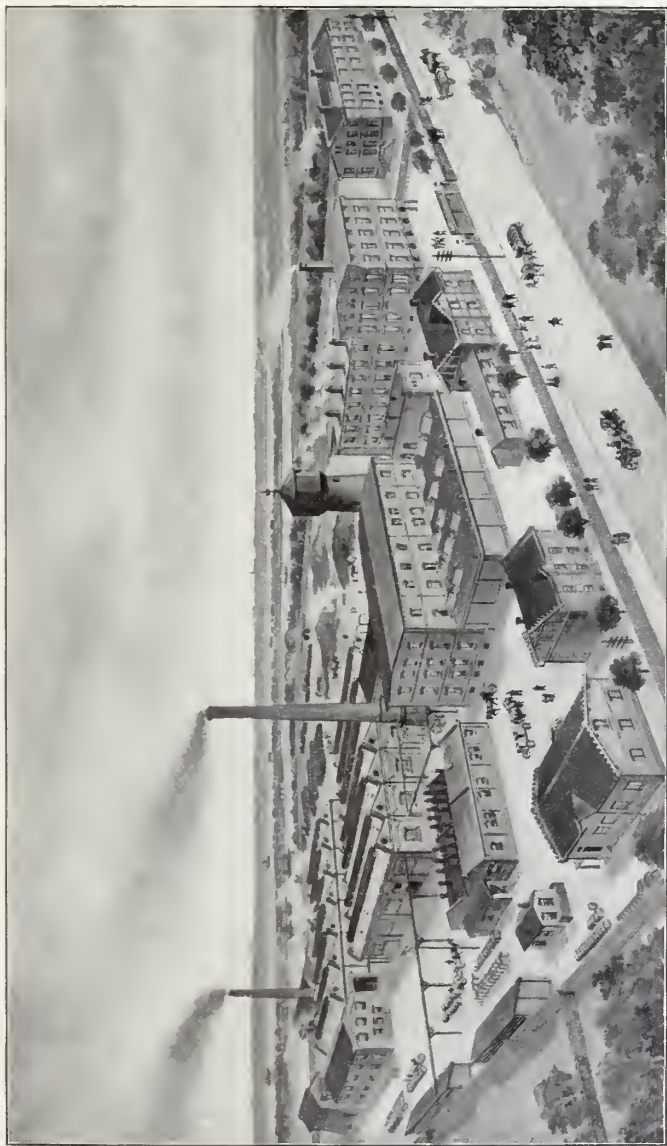
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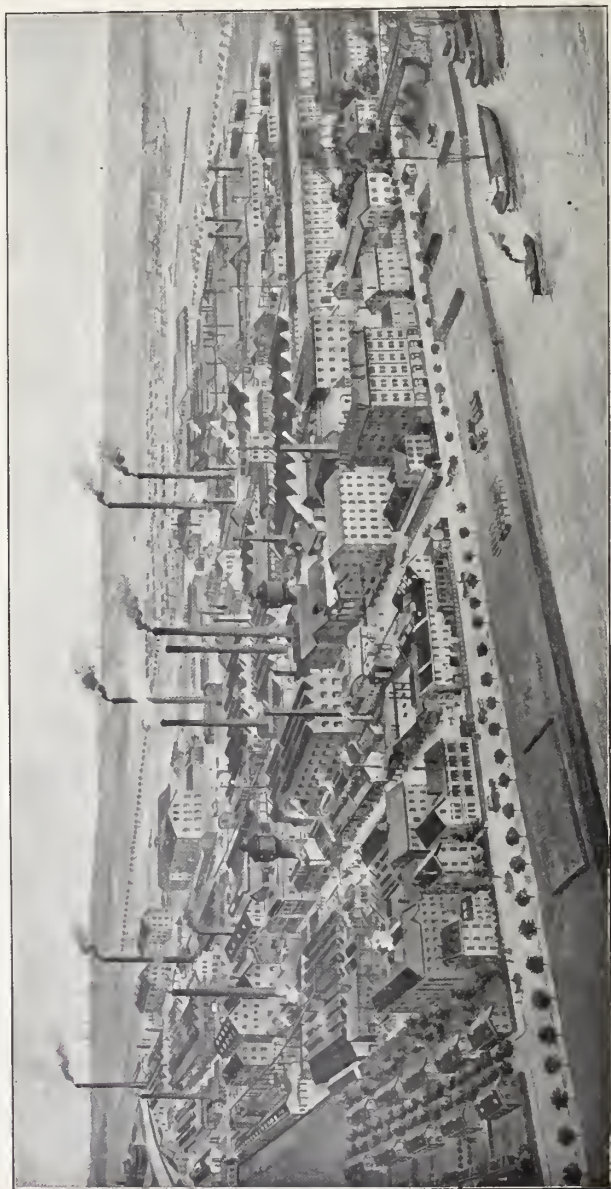
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Works at Mainkur near Frankfort o. M.



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G. m. b. H.

FRANKFORT o. M.

AMERICAN DISTRIBUTORS

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NEW YORK.

BOSTON: 68 ESSEX STREET

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## PREFACE.

This present work contains a full description of the blue Immedial Colours (Immedial Indone, Immedial Indogene, Immedial Direct Blue, Immedial Blue, Immedial New Blue, Immedial Sky Blue) and their application on loose cotton, yarn and piece-goods, as well as full particulars for machine-dyeing and warp-dyeing. The quantities of dyestuff necessary for pale and deep shades and the other additions to the dyebath are stated in carefully compiled tables. The book contains besides a number of patterns from practice.

Owing to their excellent properties of fastness and simple method of application, these dyestuffs are being used to the widest extent in every branch of the cotton dyeing industry; they are the best and favourite substitutes for Indigo, to which they are at least equal in fastness to washing and light, and superior in point of fastness to rubbing.

Frankfort o. M., October 1906.

Leopold Cassella & Co.

G. m. b. H.

65751





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Blue Immedial Colours.



## Blue Immedial Colours.

It seems appropriate to give a full description of the properties and methods of application of the blue Immedial Colours in view of their belonging to the most important dyestuffs used for cotton dyeing.

The following brands are so far known generally to the trade:

Immedial Indone 3B conc.			
"	"	B conc.	
"	"	BBF conc.	
"	"	BF conc.	
"	"	JBN conc.	
"	"	BN conc.	
"	"	R conc.	
"	"	RR conc.	
"	"	RG conc.	
"	"	RB conc.	
* Immedial Direct Blue B			
"	"	JB	
"	"	R	
"	"	OD	
Immedial Indogene GCL conc.			
"	"	B conc.	
* Immedial Blue C			
"	"	CB	
"	"	CR	
Immedial New Blue G conc.			
Immedial Sky Blue Paste			
"	"	" powder conc.	

The dyestuffs of the Immedial Indone group are distinguished for their brightness of shade. During the dyeing they are reduced similarly to Indigo, on which account it is well to oxidise them by exposure to the air after dyeing and squeezing, and only then to rinse.

The dyestuffs of this group unlike the Indone brands are not reduced. They are distinguished for their depth of shade and good levelling properties.

The dyestuffs of the Immedial Indogene group are not much reduced in the dyebath and level equally as well as Immedial Direct Blue. They possess also the important property of yielding dyeings of good fastness to chloring.

These dyestuffs may be used also for direct dyeings, but the great importance lies in their property of yielding bright and very fast shades of blue at a very low cost by means of steaming, smothering or a treatment on the fibre with oxidising agents.

Immedial Sky Blue is the brightest of all the Sulphide Blues.

The products marked with an asterisk (\*) are sold also in double strength as "extra conc." brands.

Immedial Indone  
3B conc. pat.



Immedial Indone  
BBF conc. pat.



Immedial Indone  
BF conc. pat.



Immedial Indone  
JBN conc. pat.





*Immedial Indone 3B conc. dyes the most greenish shade of any of the Immedial Indone brands; even in severe alkaline washing its dyeings retain their greenish blue tone.*

*This product is peculiarly well suited for producing pale Indigo shades, in addition to which it can be used to advantage for shading towards greenish blue on account of its good levelling properties.*

















*Much brighter shades are obtained by dyeing at a temperature of 40–50° C. (105–120 deg. F.) than at the boil.*

*These two products behave similarly to Immedial Indone 3B conc. and likewise yield much brighter shades at a temperature of 40–50° C. (105–120 deg. F.) than in the boiling bath. They are used to the largest extent for producing very bright pale and medium blues.*

*Immedial Indone JBN conc. in pale shades yields very bright, and in dark shades very deep coppery, blues which viewed over hand have the exact appearance of Indigo dyeings.*

*This product can be dyed equally well at a high or at a low temperature; dyeing in a hot bath is to be given the preference in case very deep coppery shades of Indigo are required.*

*A further brand possessing similar properties is Immedial Indone BN conc.; it behaves just like Immedial Indone JBN conc., the shade only being a little duller.*

<p>Immedial Indone R conc. pat.</p>	 	 
<p>Immedial Indone RR conc. pat.</p>	 	 
<p>Immedial Indone RG conc. pat.</p>	 	 
<p>Immedial Indone RB conc. pat.</p>	 	 

*Immedial Indone R conc. is the most generally used of the Immedial Indone brands and comes into consideration mainly for the production of full medium blue and deep Indigo shades.*

*Immedial Indone RR conc. is the reddest of the Immedial Indones and is applied for the same purposes as Immedial Indone R conc.*

*These two brands behave similarly to Immedial Indone R conc. and are applied like the latter; Immedial Indone RG conc. yields a more greenish, RB conc. a rather more covered shade.*

Immedial Indogene  
GCL conc. pat.



Immedial Indogene  
B conc. pat.



Immedial Sky Blue  
Paste pat.



Immedial Sky Blue  
Powder conc.





*The two Immedial Indogenes differ from the Immedial Indones mainly in their better levelling properties and in their property of only being slightly reduced in the dyebath. They are used to the widest extent for dyeing cotton in every stage of its manufacture, both for greenish blues and for medium blues and shaded with Immedial Direct Blue for the production of dark blues; they are particularly well adapted also for machine-dyeing.*

*The fastness to chloring of Immedial Indogene dyeings is very good, in which respect they are superior to the other blue Immedial Colours.*

*Immedial Sky Blue is the brightest blue dyestuff of the Sulphide Colour group, and is used mainly for pale, bright shades.*

*For improving the fastness to washing and light it is recommended to aftertreat the dyeings with bichromate of potash and sulphate of copper.*

*Immedial Sky Blue powder conc. possesses double the strength of Immedial Sky Blue Paste.*

Immedial Direct Blue  
B pat.



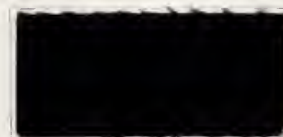
Immedial Direct Blue  
JB pat.



Immedial Direct Blue  
R pat.



Immedial Direct Blue  
OD pat.



*The Immedial Direct Blues yield very deep shades of dark blue, and are used very generally for loose cotton, hanks and piece-goods as well as for dyeing in machines. They are very easy to dye, and yield shades of excellent fastness to washing and light.*

*For brighter colours they may be shaded at will with Immedial Indone or Immedial Indogene.*

*The Immedial Direct Blues are further used largely as bottoms for Indigo dyeings.*

















*Of the various brands,*

*Immedial Direct Blue B is the principal one, which is also the most largely used;*

*„ „ „ JB is somewhat brighter but corresponds in all other respects with Immedial Direct Blue B;*

*„ „ „ R corresponds with B but yields somewhat redder shades;*

*„ „ „ OD yields considerably brighter shades than Immedial Direct Blue B.*

<p>Immedial New Blue G conc. pat.</p>	 	 
<p>Immedial Blue C pat.</p>	 	 
<p>Immedial Blue CB pat.</p>	 	 
<p>Immedial Blue CR pat.</p>	 	 

*The Immedial Blues and Immedial New Blue come into consideration in the first place for developed dyeings.*

*The developing is described on pages 129—132 of our book on "Cotton Dyeing" and is exceedingly simple; the dyeings obtained are of extraordinary fastness to washing and light and their cost is very low.*

*Immedial Blue C, CB and CR differ only in their shade from one another; CR yields the most purplish shade of blue, CB stands half way between C and CR, CB and CR yield the brightest shades.*

*Immedial New Blue G conc. behaves like the Immedial Blues and yields very bright shades of greenish blue. It is applied very largely both by itself and for shading Immedial Blues.*

*Aftertreated simply with bichromate of potash and sulphate of copper, Immedial Blue CB and CR and Immedial New Blue yield fine shades of blue possessing excellent fastness to washing and light. Especially Immedial New Blue aftertreated in this way is largely used for loose cotton, yarns and piece-goods.*





## General Part.

### The Dyeing of Blue Immedial Colours.

All the blue Immedial Colours are dyed with the addition of sodium sulphide, carbonate of soda and salt; in the case of some of them, caustic soda lye may sometimes be added in place of soda, and for a few others again glucose is added to the dyebath.

Additions to  
the  
Dye-liquor.

In the case of very pale shades or goods which are hard to penetrate, 1—2% Turkey-red oil are frequently added to the dyebath.

For the "concentrated" products, usually one-and-a-half times to twice the weight of sodium sulphide crystals as of dyestuff is generally added, and in the case of the ordinary brands the weights of sodium sulphide crystals and dyestuff are about the same; when dyeing very pale shades it is well to increase the quantity of sodium sulphide a little. In dyeing subsequent lots the proportions should be the same as for the starting baths, but as a rule when dyeing dark shades in consecutive lots the weight of the sodium sulphide to be added subsequently may be reduced by about one-fourth to one-fifth.

Quantity of  
Sodium  
Sulphide.

Only half the weight is required of the sodium sulphide concentrated as of the crystallised product.

For the starting bath it is sufficient to add 3—6 oz soda ash per 10 gallons liquor and for subsequent lots  $\frac{1}{2}$ —1% reckoned on the weight of the cotton to be dyed. When dyeing Immedial Blues and Immedial New Blue, to be developed by steaming or smothering, it is recommended to use double the quantity of soda given above. If caustic soda lye is used for

Quantity of  
Soda.

these dyestuffs instead of soda,  $\frac{1}{2}$ — $2\frac{1}{2}$  oz caustic soda lye of 77° Tw. should be used per 10 gallons liquor and for subsequent lots about  $\frac{1}{8}$ — $\frac{1}{4}$ % reckoned on the weight of the goods to be dyed.

Quantity of  
Salt.

As a rule common salt or desiccated Glauber's salt are used, the quantity of salt always being regulated by the depth of the shade to be produced. For very pale shades it is best to omit the salt altogether, and for medium shades  $\frac{1}{2}$ —1 lb salt per 10 gallons liquor should be added; for dark shades the addition of salt may be increased to  $1\frac{1}{2}$ —2 lbs per 10 gallons liquor. When dyeing subsequent lots in a standing bath, 1—2% reckoned on the weight of the goods to be dyed are sufficient and 3—5% salt for deep shades. It is recommended to test the strength of the bath occasionally by means of the hydrometer; even for dark shades it should not titrate more than 7—12° Tw. When this density has been reached no further additions of salt need be made.

If crystallised Glauber's salt be used, the quantity should be about double that of the desiccated product.

Addition of  
Glucose.

The addition of glucose, which is especially recommendable in the dyeing of Immedial Indone and Immedial Indogene, effects a better levelling and an enhances the depth of shade. For the starting bath the same quantity of glucose is used as of dyestuff, one-fifth to one-tenth of the quantity being however sufficient for subsequent lots.

Dissolving  
the  
Immedial  
Colours.

The dissolving is best carried out in wooden or iron vessels. As a general rule the dyestuff and the sodium sulphide, soda and glucose necessary for the dyeing are added simultaneously to the vessel used for the dissolving; hot condensed water is then poured over these (about 15 or 20 times the weight of water as of dyestuff), and the whole is boiled up well for a few minutes whilst stirring well.

A somewhat different method is followed in dissolving Immedial Indone 3B conc., B conc., BBF conc. and BF conc., which are best dissolved by pouring the boiling hot solution of

1 lb sodium sulphide crystals in  
about 2 gallons water over

1 lb dyestuff in a suitable vessel and bringing to solution by stirring without any further heating. The remainder of the

sodium sulphide required for the dyeing and the other ingredients are then added straight to the dyebath.

Immedial Sky Blue Paste and Powder conc. are dissolved in the following manner:

First dissolve the quantity of sodium sulphide required for dyeing in about 10 times its weight of boiling hot water, to which about one-half of the quantity of soda prescribed for dyeing is added. The Immedial Sky Blue is then stirred up well with this liquor in a wooden vessel and brought to solution by the addition of hot water. The dissolving may be accelerated by boiling a short time; prolonged boiling is not necessary because complete solution sets in very short quickly.

### Loose Cotton.

Ordinary wooden or iron vats heated with direct steam are used for dyeing. Those parts of the steampipes which may come into contact with the dye-liquor should consist of iron or lead, as copper or brass parts become corroded by the liquor. Enter the dry cotton into the boiling bath, boil for about 10 minutes, cover up the vat with a perforated cover, and allow the cotton to feed at boiling temperature for about half an hour.

Dyeing,  
Dye Vessels,  
Temperature.

After dyeing, the cotton is lifted and the liquor allowed to drain back into the dyebath.

Dyeings of *Immedial Direct Blue* and *Immedial Indogene* are thereupon rinsed immediately;

Dyeings of *Immedial Indone* and *Immedial Sky Blue* are left lying for 1 to 2 hours after dyeing in order to oxidise, whereupon they are rinsed;

Dyeings of *Immedial Blue* and *Immedial New Blue*, are hydroextracted after dyeing, placed for a few hours in a warm room for developing, or steamed with admission of air, and then rinsed.

## Cotton Hanks.

The dyeing is carried out in wooden or iron vats provided with squeezing rollers. The steam-pipes coming into contact with the dye-liquor should consist of iron or lead, because brass or copper parts are apt to become corroded.

For dyeing Immedial Direct Blue and Immedial Indogene, either bent or straight sticks may be used; the dyeing takes place at boiling temperature. After dyeing, the yarn is squeezed off well, and immediately rinsed.

Immedial Indone and Immedial Sky Blue are to advantage dyed on bent sticks. Deep shades should be produced at 70—80° C. (160—175 deg. F.), while for pale bright shades a lower temperature of 30—40° C. (85—105 deg. F.) is sufficient. The hanks are squeezed off after dyeing, wrung off quickly and well levelled at a wringing post, then exposed to the air for 1 to 2 hours, and rinsed. In some cases the dyeings are after-treated with metallic salts after rinsing.

Immedial Blue and Immedial New Blue are best dyed on bent sticks at a temperature near boiling point. After dyeing, the hanks are squeezed off, wrung off and well levelled at a wringing post, then steamed, and rinsed. If the hanks are aftertreated with metallic salts instead of being developed by steaming, the dyeings are rinsed immediately after squeezing off.

## Piece-Goods.

The dyeing of piece-goods is carried out either in the padding-machine, in the jigger provided with squeezing rollers, or in the continue-machine, the jigger being most commonly used for this purpose. The padding-machine is used principally for

pale and medium shades and for light materials, dyeing in the continue-machine on the other hand for dyeing blue staple shades.

The dye vessels used should have no brass or copper fittings: the dye vats should be of wood or iron and those parts of the steampipes which come into contact with the dye-liquor should be made of iron or lead.

It is very important that the goods should finally be squeezed off well and evenly. Squeezing rollers of iron well covered with rubber or with cotton cloth are used to most advantage, and the pressure of the rollers should be increased by weighted levers.

Immedial Direct Blue and Immedial Indogene are dyed near the boiling temperature. After dyeing, the pieces are squeezed off well and then rinsed immediately.

Immedial Indone and Immedial Sky Blue are dyed near the boiling temperature for deep shades and at a temperature of  $50-60^{\circ}$  C. ( $120-140$  deg. F.) for pale bright shades. The pieces are squeezed off well during the final passage, given an air passage for oxidation, and then rinsed.

Immedial Blue and Immedial New Blue are dyed near the boiling temperature. The goods are squeezed off well after dyeing, batched without rinsing, and finally developed either by steaming or by smothering.

### Machine-Dyeing.

With regard to dyeing loose cotton, yarns, cheeses and cops in dyeing-machines see the respective chapter dealing with these subjects.



### Developing Immedial Blue and Immedial New Blue.

The developing may be done either by smothering or by steaming. Developing by smothering is exceedingly simple; the goods are not rinsed, but merely well hydroextracted, wrung or squeezed off, and placed for a few hours into a warm room where by 4 or 5 hour's storing a bright, fast blue is developed.

The same effect is obtained by steaming the goods for  $\frac{1}{2}$  hour with admission of air after the dyeing, and hydro-extracting or squeezing off. The steaming may take place in any wooden vat available for the purpose.

Loose cotton, pieces and cheeses are usually developed by smothering, whereas developing by steaming is to be given the preference for yarns and cops.

Full directions for the developing will be found on pages 129—131 of our book on "Cotton Dyeing".

In some few cases the blue after dyeing and rinsing is developed in a bath charged with peroxide of sodium; directions for this process will be found on page 132 of our book on "Cotton Dyeing".

### Aftertreatment with Metallic Salts.

If the demands for fastness do not exceed the ordinary requirements in this respect, an aftertreatment of the blue Immedial Colours is unnecessary; such aftertreatment, which considerably increases the fastness to light and to boiling, should in fact be applied only when the requirements are especially exacting.

For this purpose, the dyeings are treated for about  $\frac{1}{2}$  hour in a bath charged with:

2—3 % sulphate of copper,  
 $\frac{1}{2}$ —1 % bichromate of potash and  
3—4 % acetic acid

at a temperature of 60—80° C. (140—175 deg. F.).

### Combinations of Immedial Colours.

The blue Immedial Colours may be combined at will with one another or with any other Immedial Colours. A combination of Immedial Direct Blue with Immedial Indone or Immedial Indogene is very frequent and useful. The blue Immedial Colours may also be shaded to advantage with the various brands of Immedial Green and with Immedial Bordeaux, or saddened with the various brands of Immedial Black. The method of dyeing is the same in such case as given for the blue Immedial Colours in our tables.

### Topping with Basic Colours.

The dyeings may be brightened by topping with Basic Colours, for which purpose any of the blue or violet Basic Colours may be used. For coppery shades of blue resembling Indigo a light topping with Naphtindone BB is found very useful.

### Immedial Blue in Combination with Indigo.

The various Immedial Blue and Immedial Direct Blue brands are used to a very wide extent as a bottom for Indigo. By such bottoming, Indigo dyeings gain very much in fastness, especially in fastness to rubbing and washing, their cost being also considerably lower. As a rule it is not necessary to develop Immedial Blue at all before topping with Indigo.

Bottoming with Indigo and topping with blue Immedial Colours is also resorted to in some cases with good results.

---

## Fastness of the Blue Immedial Colours compared with that of Indigo.

The blue Immedial Colours are the most perfect and approved substitutes for Indigo.

Dyeings of the blue Immedial Colours are superior to those of Indigo in *fastness to washing* because they lose only very slightly even in severe washing, whereas Indigo dyeings in fact become paler with each washing. Immedial Colours, especially those treated with sulphate of copper or with bichromate of potash and sulphate of copper are very fast to boiling with soap and alkali.

The Immedial Colours are very considerably superior to Indigo in *fastness to rubbing*; Indigo always rubs off very badly, a disadvantage which is very noticeable both in the working up of Indigo dyed goods and in wearing. Immedial Blues owing to their excellent fastness to wearing do not show this disadvantage.

The *fastness to light* of the Immedial Colours is excellent. This fact is illustrated by the attached patterns which have been alternately exposed to light and subjected to domestic washing.

*Fastness to acids*: the blue Immedial Colours resist boiling in acid baths very satisfactorily without losing in depth of shade.

*Fastness to chloring*: Immedial Indogene B conc., Immedial New Blue G conc. and Immedial Sky Blue withstand weak chlorine baths, whilst Immedial Indogene GCL conc. will resist even fairly severe chloring.

In *fastness to hot pressing and mangling* the blue Immedial Colours are likewise superior to Indigo.

On the next page will be found exact comparative tests demonstrating the fastness to washing and light of Indigo dyeings against dyeings of Immedial Blue CB, developed, and of Immedial Indone in combination with Immedial Direct Blue. These tests were exposed to light for six weeks during June and July while being subjected once a week to a severe household washing with soda and soap.

Immedial Indone BF conc. pat. and Immedial Direct Blue B pat.  
not washed                      washed and exposed to light



Indigo

not washed



washed and exposed to light



Immedial Blue CB pat. (developed)

not washed



washed and exposed to light



Indigo

not washed



washed and exposed to light







The Dyeing of Loose Cotton.





## The Dyeing of Loose Cotton.

Loose cotton is dyed in vats of wood or iron which are best heated by direct steam. Any parts of the steam-pipes which come into contact with the dye liquor should be of iron or lead as the liquor will corrode copper or brass parts.

The dyeing is carried out in as concentrated a liquor as possible, as a rule about 15 to 18 times the weight of the cotton to be dyed, and the special recipes mentioned on the following pages for the individual dyestuffs are to be understood for this volume of liquor.

As a rule the dry cotton is entered straight into the boiling hot bath, previously charged with all its ingredients; it is then boiled well and worked for 10 to 20 minutes. The dye-vat is then covered up, and the cotton, which is to be kept well covered by the liquor, is allowed to feed for another  $\frac{1}{2}$  to  $\frac{3}{4}$  hour. After dyeing, the cotton is thrown either on a lattice frame placed over the dyebath or into baskets, saving the greater part of the liquor it contains by allowing it to drain back into the bath.

Dyeings of Immedial Direct Blue and Immedial Indogene are then as a rule rinsed immediately.

Immedial Indone and Immedial Sky Blue dyeings are freed as much as possible from excess of liquor by squeezing off, then left lying exposed to the air for  $\frac{1}{2}$  to 1 hour in order to oxidise, and finally rinsed.

Dyeings of Immedial Blue and Immedial New Blue are hydroextracted, developed either by smothering for a few hours or by steaming, and then rinsed.

The rinsing takes place in vats similar to those used for the dyeing or preferably in a washing machine.

Immedial Indone 3B conc., B conc., BBF conc., BF conc.,  
BN conc., JBN conc., R conc., RR conc., RG conc., RB conc.

100 lbs loose Cotton in about 160 gallons liquor	For pale and medium shades		For deep shades	
	Starting bath	Subsequent lots	Starting bath	Subsequent lots
Dyestuff	2-10 lbs	1 $\frac{1}{2}$ - 6 lbs	10-16 lbs	7-10 lbs
Sodium sulphide crystals	6-20 "	3 - 12 "	20-32 "	12-16 "
Soda ash	3- 6 "	$\frac{3}{8}$ - 1 lb	3- 6 "	$\frac{3}{8}$ - 1 lb
Common salt or desiccated Glauber's salt	2-12 "	0 - 2 lbs	12-24 "	2-10 lbs

Enter the dry cotton into the bath previously boiled up together with all the ingredients, boil for 10 to 20 minutes, shut off steam, and dye for  $\frac{1}{2}$  to  $\frac{3}{4}$  hour without further heating.

Then throw up the cotton, press the liquor off well, expose to the air  $\frac{1}{2}$  to 1 hour for oxidising purposes, and then rinse.

By adding glucose (for the starting bath about the same weight as of dyestuff and for subsequent lots about  $\frac{1}{5}$ th to  $\frac{1}{10}$ th the weight of the dyestuff) fuller, and redder shades may be obtained with Immedial Indone R conc., RR conc., RG conc., RB conc. and BF conc.

Brighter shades are obtained by dyeing at a temperature, of 50-60° C. (120-140 deg. F.); in such case the cotton should be wetted out before entering, or 1 to 2% Turkey-red oil should be added to the dyebath.

When using combinations of Immedial Indone with Immedial Direct Blue or Immedial Indogene, the directions for the dyestuff which is used as the base of the shade are usually followed.

The above directions are to be understood for dyeing in the normal volume of liquor which is 15-18 times increased in proportion to the relative quantities of liquor and cotton. If for weights of dyestuff and other ingredients must

When dyeing subsequent lots in the standing bath, the same weights of dyestuff and  
For directions of dissolving the

Immedial Indogene GCL conc., B conc.

100 lbs loose Cotton in about 160 gallons liquor	For pale and medium shades		For deep shades	
	Starting bath	Subsequent lots	Starting bath	Subsequent lots
Dyestuff	2—10 lbs	1½— 6 lbs	10—16 lbs	6— 9 lbs
Sodium sulphide crystals	6—20 „	3 —10 „	20—32 „	10—14 „
Soda ash	3— 6 „	¾— 1 lb	3— 6 „	¾— 1 lb
Common salt or desiccated Glauber's salt	4—16 „	0 — 2 lbs	16—32 „	2—10 lbs

Enter the dry cotton into the bath previously boiled up together with all its ingredients; boil for 10—20 minutes, and dye for another ½ to ¾ hour without further heating.

After dyeing, throw up the cotton, allow to drain a short time, and then rinse at once.

Somewhat redder shades result from allowing the cotton to oxidise exposed to the air for ½ to ¾ hour after lifting.

Immedial Indogene GCL conc. dyed at a temperature of about 40—50° C. (105—120 deg. F.) yields brighter and more greenish shades; in such a case, the cotton should however be wetted out before dyeing.

Combinations of Immedial Indogene and Immedial Direct Blue are used to a very large extent and are dyed like Immedial Indogene.

the weight of the cotton. If a more dilute liquor be used, the weights of the ingredients have to be instance, the liquor amounts to 25 times the weight of the cotton, the afore-mentioned be increased by one-quarter to one-third.  
other ingredients are required whether for a concentrated or a more dilute bath,  
dyestuffs see pages 14 and 15.

Immedial Direct Blue B, JB, R, OD

100 lbs loose Cotton in about 160 gallons liquor	For pale and medium shades		For deep shades	
	Starting bath	Subsequent lots	Starting bath	Subsequent lots
Dyestuff	6-10 lbs	4-7 lbs	10-16 lbs	7-10 lbs
Sodium sulphide crystals	6-10 "	4-7 "	10-16 "	7-10 "
Soda ash	3- 6 "	$\frac{3}{8}$ -1 lb	3- 6 "	$\frac{3}{8}$ - 1 lb
Common salt or desiccated Glauber's salt	4-12 "	0-2 lbs	12-24 "	2- 8 lbs

Boil up the dyebath together with all its ingredients, enter the dry cotton, and dye at the boil for 10 to 20 minutes and then for  $\frac{1}{2}$  to  $\frac{3}{4}$  hour without further heating. Thereupon allow the liquor to drain off, and rinse.

Deeper, more reddish shades may be obtained by exposing the cotton to the air to oxidise either before or, if desired, after rinsing.

Brighter and more reddish shades are obtained by brightening with  $\frac{1}{2}$  to 3 oz soda ash and  $\frac{1}{2}$  to 3 oz soap per 10 gallons liquor.

The directions for dyeing Immedial Direct Blue B extra conc. and JB extra conc. are the same as given for the single strength brands except that only half the quantities of dyestuff are required, the weight of the other ingredients remaining the same as for the single strength brands.

Directions for dyeing combinations of Immedial Direct Blue with Immedial Indone or Immedial Indogene are given on pages 24 and 25.

The above directions are to be understood for dyeing in the normal volume of liquor which is 15-18 times increased in proportion to the relative quantities of liquor and cotton. If for weights of dyestuff and other ingredients must

When dyeing subsequent lots in the standing bath, the same weights of dyestuff and  
For directions of dissolving the

# Loose Cotton.

## Immedial Blue C, CB, CR

100 lbs loose Cotton in about 160 gallons liquor	For pale and medium shades		For deep shades	
	Starting bath	Subsequent lots	Starting bath	Subsequent lots
Dyestuff	6—12 lbs	4—8 lbs	12 —20 lbs	8—12 lbs
Sodium sulphide crystals	6—12 „	4—8 „	12 —20 „	8—12 „
Caustic soda lye of 75 <sup>0</sup> Tw.	3/4—1 1/2 lb	3—6 oz	1 1/2— 3 „	3— 6 oz
Common salt or desiccated Glauber's salt	4—12 lbs	0—2 lbs	12 —24 „	2—10 lbs

Boil up the bath together with all its ingredients, enter the cotton, dye for 10 to 20 minutes at the boil and for 1/2 to 3/4 hour without further heating.

Then throw up the cotton, allow the liquor to drain for a short time, hydroextract\*), and develop either by smothering or by steaming with the admission of air.

Developing by smothering is the simplest and most commonly applied method for loose cotton, full directions regarding which will be found on page 199 of our book on "Cotton Dyeing".

After developing, the goods are rinsed hot and softened if necessary.

More covered, and less bright shades may be obtained by using 8 oz to 1 lb soda per 10 gallons liquor in place of caustic soda lye.

Brighter shades may be obtained by shading Immedial Blue with Immedial New Blue conc. Amongst other products suited for shading, the other blue Immedial Colours, Immedial Black, Immedial Green, etc. may be used. In such case the dyeing is carried out as indicated for Immedial Blue.

Immedial Blue C extra conc., CB extra conc. and CR extra conc. are dyed like the single strength brands except that only half the quantities of dyestuff are required, the weights of the other ingredients remaining the same.

\* Hydroextractors of iron are best adapted for this purpose; if copper drums only be available, they should be well lined with some thick cotton cloth and very thoroughly rinsed after use. It is however preferable to have the copper drums tin-lined or, even better, nickel-plated.

the weight of the cotton. If a more dilute liquor be used, the weights of the ingredients have to be instance, the liquor amounts to 25 times the weight of the cotton, the afore-mentioned be increased by one-quarter to one-third.

other ingredients are required whether for a concentrated or a more dilute bath, dyestuffs see pages 14 and 15.



Immedial New Blue G conc.

100 lbs loose Cotton in about 160 gallons liquor	For pale and medium shades		For deep shades	
	Starting bath	Subsequent lots	Starting bath	Subsequent lots
Dyestuff	6—12 lbs	4—8 lbs	12—20 lbs	8—12 lbs
Sodium sulphide crystals	12—20 "	6—12 "	20—30 "	12—18 "
Caustic soda lye of 75° Tw.	3/4—1 1/2 lb	3—6 oz	1 1/2—3 "	3—6 oz
Common salt or desiccated Glauber's salt	4—12 lbs	0—2 lbs	12—24 "	2—10 "

Immedial New Blue G conc. is dyed exactly like Immedial Blue and is then developed either by smothering or by steaming.

Instead of being developed by steaming or smothering, Immedial New Blue G conc. may be aftertreated with sulphate of copper or bichromate of potash which results in darker shades of eminent fastness to washing and light being obtained. The liquor is then allowed to drain off, and the cotton rinsed at once and aftertreated as indicated on page 30.

When developing Immedial New Blue by steaming or smothering, Immedial Blue C, CB or CR are best used for saddening.

Immedial New Blue may be combined at will with any of the other Immedial Colours when aftertreating with metallic salts.

The above directions are to be understood for dyeing in the normal volume of liquor which is 15—18 times increased in proportion to the relative quantities of liquor and cotton. If for weights of dyestuff and other ingredients must

When dyeing subsequent lots in the standing bath, the same weights of dyestuff and  
For directions of dissolving the

# Loose Cotton.

## Immedial Sky Blue Paste and Powder conc.

100 lbs loose Cotton in about 160 gallons liquor	For pale and medium shades		For deep shades	
	Starting bath	Subsequent lots	Starting bath	Subsequent lots
Immedial Sky Blue Paste	1—10 lbs	1/2—5 lbs	10—20 lbs	5 —9 lbs
Sodium sulphide crystals	1— 5 „	1/2—2 1/2 „	5—10 „	2 1/2—4 1/2 „
Soda ash	2— 4 „	1/2—1 lb	4— 5 „	1 —1 1/4 „
Turkey-red oil	2 „	1/2 „	2 „	1/2 „
Common salt or desiccated Glauber's salt	4—20 „	0—4 lbs	20—40 „	4 —10 „

Wet out the cotton in a hot bath before dyeing, if necessary with the addition of some Turkey-red oil.

Dye for 1 1/2 to 3/4 hour at 30—40° C. (75—105 deg. F.), throw up the cotton, allow the liquor to drain off, and hydroextract. Then oxidise by leaving exposed to the air, and rinse.

In case of more exacting requirements with regard to fastness, it is well to aftertreat dyeings of Immedial Sky Blue with sulphate of copper and bichromate of potash according to the directions on page 30.

Immedial Sky Blue Powder conc. being double the strength of Immedial Sky Blue Paste, only half the quantity is required as of the latter for equal depths of shades, the weights of the other ingredients remaining unaltered.

the weight of the cotton. If a more dilute liquor be used, the weights of the ingredients have to be instance, the liquor amounts to 25 times the weight of the cotton, the afore-mentioned be increased by one-quarter to one-third.

other ingredients are required whether for a concentrated or a more dilute bath.  
dyestuffs see pages 14 and 15

### Topping with Basic Colours.

The dyeings are frequently topped with Basic Colours, either for shading or with a view to obtaining greater brightness. The Basic Colours serving this purpose best are the following:

For bright blue shades:

New Methylene Blue GG, GB, N, R  
Methylene Blue BB.

For very red shades:

Methyl Violet, all brands  
Crystal Violet 10B  
New Methylene Blue 3R.

For very deep bronzy Indigo shades:

Naphtindone BB.

The topping is best done in a washing machine by adding first to the cold bath 5—10% acetic acid or alum and then the dyestuff in several portions. If more than the ordinary quantities of Basic Colours are used for topping, it is well to raise the temperature of the bath gradually to 50—60° C. (120—140 deg. F.) after the whole of the dyestuff has been added; if on the other hand only small quantities are added merely for brightening purposes or for a slight shading, there is no necessity to raise the temperature of the bath.

### Aftertreatment with Metallic Salts.

An aftertreatment of the blue Immedial Colours with metallic salts is resorted to only in isolated cases in view of the fact that the direct dyeings possess already eminently good fastness. The fastness to light, and more particularly the fastness to boiling, may however be still further improved by this aftertreatment.

After dyeing, the cotton is freed from any excess liquor by pressing off or hydroextracting, it is then rinsed thoroughly, and aftertreated for about  $\frac{1}{2}$  hour with

1—2 % sulphate of copper,  
 $\frac{1}{2}$ —1 % bichromate of potash and  
3—4 % acetic acid

at a temperature of about 60—70° C. (140—160 deg. F.)

The cotton is finally rinsed, and dried.

# Direct Blues on Loose Cotton.

The blue Immedial Colours are used to a wide extent on loose cotton both for direct and developed shades. For dyeing direct they may be applied easily both in combinations with one another and shaded with other Immedial Colours, or topped with Basic Colours; a great variety of blue shades of excellent fastness to milling, washing, light, and acids may be easily obtained in this way without affecting the softness or spinning properties of the material.

- |         |      |     |                                    |
|---------|------|-----|------------------------------------|
| No. 1.  | 1    | 0/0 | Immedial Indone 3B conc. pat.      |
|         | 0,07 | 0/0 | Immedial Direct Blue B pat.        |
| No. 2.  | 4    | 0/0 | Immedial Indone BF conc. pat.      |
| No. 3.  | 5,5  | 0/0 | Immedial Indone RR conc. pat.      |
|         | 1,4  | 0/0 | Immedial Direct Blue B pat.        |
| No. 4.  | 3,5  | 0/0 | Immedial Indogene GCL conc. pat.   |
|         | 0,5  | 0/0 | Immedial Direct Blue B pat.        |
|         | 3,5  | 0/0 | Immedial Green BB extra.           |
| No. 5.  | 3,5  | 0/0 | Immedial Indone R conc. pat.       |
|         | 1,2  | 0/0 | Immedial Direct Blue B pat.        |
| No. 6.  | 5    | 0/0 | Immedial Indogene GCL conc. pat.   |
|         | 0,6  | 0/0 | Immedial Direct Blue B pat.        |
| No. 7.  | 4,5  | 0/0 | Immedial Indogene B conc. pat.     |
|         | 1,5  | 0/0 | Immedial Direct Blue R pat.        |
| No. 8.  | 8    | 0/0 | Immedial Direct Blue B pat.        |
|         | 1    | 0/0 | Immedial Black NN conc.            |
|         | 0,5  | 0/0 | Immedial Maroon B conc. pat.       |
| No. 9.  | 7    | 0/0 | Immedial Indone RB conc. pat.      |
|         | 0,6  | 0/0 | Immedial Black NN conc.            |
| No. 10. | 5    | 0/0 | Immedial Indogene GCL conc. pat.   |
|         | 1,5  | 0/0 | Immedial Indogene B conc. pat.     |
|         |      |     | topped with                        |
|         |      |     | 0,1 0/0 New Methylene Blue GG pat. |
| No. 11. | 7,5  | 0/0 | Immedial Indogene B conc. pat.     |
|         | 0,75 | 0/0 | Immedial Dark Green B.             |
| No. 12. | 3    | 0/0 | Immedial Indone 3B conc. pat.      |
|         | 0,5  | 0/0 | Immedial Direct Blue B pat.        |
| No. 13. | 8    | 0/0 | Immedial Indogene B conc. pat.     |
|         | 2,5  | 0/0 | Immedial Dark Green B              |
|         | 0,8  | 0/0 | Immedial Black NN conc.            |
|         |      |     | topped with                        |
|         |      |     | 0,2 0/0 New Methylene Blue GG pat. |
| No. 14. | 4    | 0/0 | Immedial Indogene GCL conc. pat.   |
| No. 15. | 4,5  | 0/0 | Immedial Indone RB conc. pat.      |
|         | 2    | 0/0 | Immedial Deep Green G pat.         |
| No. 16. | 5    | 0/0 | Immedial Indogene GCL conc. pat.   |
|         | 0,8  | 0/0 | Immedial Green BB extra.           |

Direct Blues.

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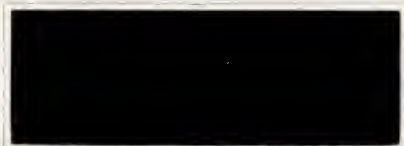
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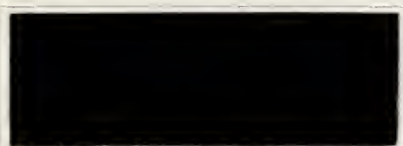
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## Direct and Developed Blues on Loose Cotton.

In addition to the direct Blues, developed Blues are also used very largely for loose cotton owing to the exceedingly simple method of their application.

The developing is most commonly carried out by means of smothering which does not necessitate any special appliances or outlay (see our book on "Cotton Dyeing", page 199).

By this method Blues of excellent fastness to milling and washing are obtained which also deserve especial notice on account of their low cost.

### Direct Blues.

- |         |         |                                     |
|---------|---------|-------------------------------------|
| No. 17. | 5,5 0/0 | Immedial Indogene B conc. pat.      |
|         | 1 0/0   | Immedial Green BB extra.            |
| No. 18. | 4 0/0   | Immedial Indone RR conc. pat.       |
|         | 2,5 0/0 | Immedial Direct Blue B pat.         |
| No. 19. | 4 0/0   | Immedial Indone R conc. pat.        |
|         |         | topped with                         |
|         | 0,4 0/0 | New Methylene Blue N.               |
| No. 20. | 5,5 0/0 | Immedial Indone RR conc. pat.       |
|         | 1,2 0/0 | Immedial Direct Blue R pat.         |
| No. 21. | 10 0/0  | Immedial Direct Blue R pat.         |
|         | 1 0/0   | Immedial Bordeaux G conc. pat.      |
| No. 22. | 3 0/0   | Immedial Sky Blue Powder conc. pat. |
| No. 23. | 6,5 0/0 | Immedial Indogene GCL conc. pat.    |
|         | 1,7 0/0 | Immedial Direct Blue B pat.         |
| No. 24. | 4 0/0   | Immedial Indone RR conc. pat.       |
|         | 4 0/0   | Immedial Direct Blue R pat.         |

### Developed Blues.

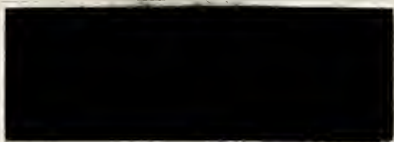
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|---------|---------|--------------------------------|
| No. 25. | 4 0/0   | Immedial New Blue G conc. pat. |
| No. 26. | 6 0/0   | Immedial New Blue G conc. pat. |
|         | 2,5 0/0 | Immedial Blue C pat.           |
| No. 27. | 11 0/0  | Immedial Blue CR pat.          |
|         |         | topped with                    |
|         | 0,2 0/0 | New Methylene Blue R pat.      |
| No. 28. | 4 0/0   | Immedial New Blue G conc. pat. |
|         | 6 0/0   | Immedial Blue CR pat.          |
| No. 29. | 4 0/0   | Immedial New Blue G conc. pat. |
|         | 2 0/0   | Immedial Blue CR pat.          |
| No. 30. | 9 0/0   | Immedial Blue C pat.           |
|         |         | topped with                    |
|         | 0,2 0/0 | New Methylene Blue GG pat.     |
| No. 31. | 7 0/0   | Immedial Blue CB pat.          |
| No. 32. | 9 0/0   | Immedial Blue CR pat.          |
|         | 1,5 0/0 | Immedial Black NN conc.        |
|         |         | topped with                    |
|         | 0,2 0/0 | New Methylene Blue R pat.      |

Direct Blues.

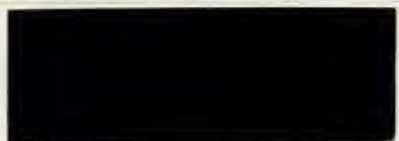
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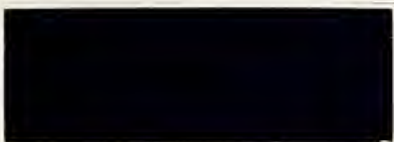
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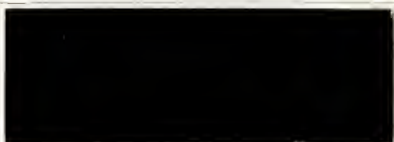
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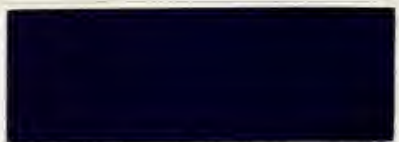


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Developed Blues.

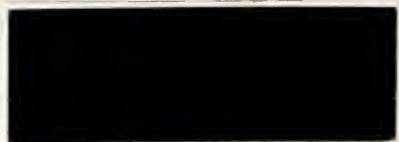
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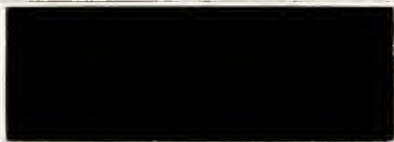
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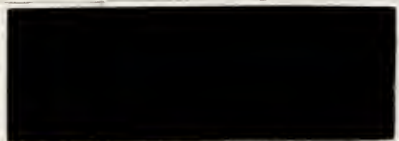
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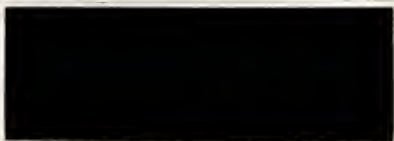
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The Dyeing of Cotton Yarn in Hanks.

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## The Dyeing of Cotton Yarn in Hanks.

For dyeing cotton yarn, the ordinary rectangular wooden vats are best suited. They should be provided with steam coils made of iron or lead and heated by indirect steam. At the narrow end of the vats squeezing rollers should be arranged, by which the yarn is freed after dyeing from any excess liquor adhering so as to save colouring matter and secure best possible levelness.

Bent iron rods are best used as dyesticks as they allow of the hanks being constantly immersed in the liquor; in many cases, however, straight sticks may be used just as well, the yarn on the sticks being sunk into the liquor in between the turning.

Sketches of dyevats with squeezing appliances and of the bent rods will be found on page 227 of our book on "Cotton Dyeing" and in our pamphlet No 2490.

Immedial Direct Blue and Immedial Indogene may be dyed on bent or on straight sticks. After dyeing, the yarn is squeezed off thoroughly and rinsed immediately.

Immedial Indone and Immedial Sky Blue are best dyed on bent rods. After dyeing, the yarn is squeezed off, wrung off and levelled at the wringing post, then exposed to the air for  $\frac{1}{2}$ —1 hour, and rinsed.

Immedial Blue and Immedial New Blue are best dyed on bent sticks; after dyeing, the yarn is squeezed off, wrung off and levelled at the wringing post, steamed, and rinsed hot. If the yarn is aftertreated with metallic salts instead of developing by steaming, it is rinsed immediately after squeezing off and then aftertreated.



Immedial Indone 3B conc., B conc., BBF conc., BF conc.,  
BN conc., JBN conc., R conc., RR conc., RG conc., RB conc.

100 lbs yarn in about 200 gallons liquor	For pale and medium shades		For deep shades	
	Starting bath	Subsequent lots	Starting bath	Subsequent lots
Dyestuff	2-10 lbs	1 $\frac{1}{2}$ -6 lbs	10-16 lbs	7-9 lbs
Sodium sulphide crystals	6-20 "	3-10 "	20-32 "	12-14 "
Glucose	2-10 "	$\frac{3}{8}$ -1 "	10-16 "	1-1 $\frac{1}{2}$ "
Soda ash	4-8 "	$\frac{3}{8}$ -1 "	4-8 "	$\frac{3}{8}$ -1 "
Common salt or desiccated Glauber's salt	2-15 "	0-1 "	15-30 "	2-8 "

The well boiled yarn is best dyed on bent rods for about 1 hour, pale shades at 30-40° C. (85-105 deg. F.), deep shades at 50-60° C. (120-140 deg. F.); it is then squeezed off well, wrung off at once three or four times at the wringing post, and hung up for  $\frac{1}{2}$  hour; finally it is rinsed thoroughly and if necessary soaped or aftertreated with metallic salts.

More greenish and less full shades are obtained if the oxidising is omitted.

When dyeing deep shades of Immedial Indone JBN conc., BN conc. and RB conc. the temperature of the dyebath is to advantage raised to 80-90° C. (175-195 deg. F.).

The addition of glucose renders the shades deeper and more reddish, especially those of R conc., RR conc., RG conc. and RB conc., but has practically little effect with the other brands.

Combinations of Immedial Indone, Immedial Indogene and Immedial Direct Blue are extensively used, in particular for imitating Indigo shades; in such case the dyeing instructions for the predominating dyestuff are followed.

A special method of dyeing Immedial Indone is mentioned on page 42.

The above directions are to be understood for dyeing in the normal volume of liquor which is 18-20 times increased in proportion to the relative quantities of liquor and yarn. If, for mentioned weights of dyestuff and other ingredients

When dyeing subsequent lots in the standing bath, the same weights of dyestuff and

If the demands for fastness to washing and light are very exacting, it is advisable to aftertreat

For directions for dissolving the

# Dyeing Cotton Yarn.

## Immedial Indogene GCL conc., B conc.

100 lbs yarn in about 200 gallons liquor	For pale and medium shades		For deep shades	
	Starting bath	Subsequent lots	Starting bath	Subsequent lots
Dyestuff	2-10 lbs	1 $\frac{1}{2}$ -6 lbs	10-16 lbs	6-9 lbs
Sodium sulphide crystals	6-20 "	3-10 "	20-32 "	10-14 "
Soda ash	4-8 "	$\frac{3}{8}$ -1 "	4-8 "	$\frac{3}{8}$ -1 "
Common salt or desiccated Glauber's salt	4-20 "	0-2 "	20-40 "	2-10 "

Dye the well boiled yarn on straight or bent sticks for 1 hour at boiling temperature, squeeze off, and rinse.

Immedial Indogene GCL conc. when dyed at about 50° C. (120 deg. F.) yields brighter and more greenish shades. By the addition of glucose however (about the same weight as of dyestuff for the starting bath) and by exposure to the air after wringing off, dyeings of both brands assume more reddish and brighter shades.

## Immedial Sky Blue Paste and Powder conc.

100 lbs yarn in about 200 gallons liquor	For pale and medium shades		For deep shades	
	Starting bath	Subsequent lots	Starting bath	Subsequent lots
Immedial Sky Blue Paste	1-10 lbs	$\frac{1}{2}$ -5 lbs	10-20 lbs	5-9 lbs
Sodium sulphide crystals	1-5 "	$\frac{1}{2}$ -2 $\frac{1}{2}$ "	5-10 "	2 $\frac{1}{2}$ -4 $\frac{1}{2}$ "
Soda ash	2-4 "	$\frac{1}{2}$ -1 "	4-5 "	1-1 $\frac{1}{4}$ "
Turkey-red oil	2 "	$\frac{1}{2}$ "	2 "	$\frac{1}{2}$ "
Common salt or desiccated Glauber's salt	4-20 "	0-4 "	20-40 "	4-10 "

Dyeing is best done on bent sticks at 30-35° C. (85-95 deg. F.) for  $\frac{1}{4}$ -1 hour; the yarn is then squeezed off, wrung off, oxidised for  $\frac{1}{2}$ -1 hour, and rinsed.

If the demands for fastness are more exacting, the dyed yarn is aftertreated with sulphate of copper and bichromate of potash.

Immedial Sky Blue Powder conc. is double the strength of the paste product; consequently only half the quantity of dyestuff is necessary for producing the same depth of shade, the weight of the other ingredients remaining the same.

the weight of the yarn. If a more dilute liquor be used, the weights of the ingredients have to be instance, the liquor amounts to 25-30 times the weight of the yarn, the afore- must be increased by one-quarter to one-third.

other ingredients are required whether for a concentrated or more dilute bath.

the dyeings with sulphate of copper and bichromate of potash as per directions on page 18. dyestuffs see pages 14 and 15.

Immedial Direct Blue B, R, JB and OD.

100 lbs yarn in about 200 gallons liquor	For pale and medium shades		For deep shades	
	Starting bath	Subsequent lots	Starting bath	Subsequent lots
Dyestuff	6—10 lbs	4—7 lbs	10—16 lbs	7—10 lbs
Sodium sulphide crystals	6—10 "	4—7 "	10—16 "	7—10 "
Soda ash	4—8 "	$\frac{3}{8}$ —1 "	4—8 "	$\frac{3}{8}$ —1 "
Common salt or desiccated Glauber's salt	4—15 "	0—2 "	15—30 "	2—10 "

Dye the well boiled yarn on bent or on straight sticks for 1 hour at boiling temperature, squeeze off, and rinse.

By a prolonged exposure to the air after rinsing, or by treating with  $1\frac{1}{2}$ —3 oz soap and  $2\frac{1}{2}$ —3 oz soda per 10 gallons liquor, somewhat brighter and more purplish shades are obtained.

Combinations of Immedial Direct Blue with Immedial Indone and Immedial Indogene are dyed according to the directions given for the predominating dyestuff; such combinations are generally dyed at boiling temperature. After dyeing, squeeze off and rinse immediately.

Immedial Direct Blue B extra conc. and JB extra conc. are dyed like the single strength brands, using however only half the quantities of dyestuff; the weight of the other ingredients remain the same.

The above directions are to be understood for dyeing in the normal volume of liquor which is 18—20 times increased in proportion to the relative quantities of liquor and yarn. If, for mentioned weights of dyestuff and other ingredients

When dyeing subsequent lots in the standing bath, the same weights of dyestuff and If the demands for fastness to washing and light are very exacting, it is advisable to aftertreat For directions for dissolving the

## Immedial Blue C, CB, CR

100 lbs yarn in about 200 gallons liquor	For pale and medium shades		For deep shades	
	Starting bath	Subsequent lots	Starting bath	Subsequent lots
Dyestuff	6—12 lbs	4—8 lbs	12—20 lbs	8—12 lbs
Sodium sulphide crystals	6—12 „	4—8 „	12—20 „	8—12 „
Caustic soda lye 75° Tw.	1—2 „	3—6 oz	2—4 „	3—6 oz
Common salt or desiccated				
Glauber's salt	4—15 „	0—2 lbs	15—30 „	2—10 lbs

Dye the previously well boiled yarn, best on bent sticks, for about 1 hour at boiling temperature, squeeze off, wring off at the wringing post, and develop the blue by steaming, without previously rinsing.

Instead of caustic soda lye, soda may also be used ( $1\frac{1}{2}$ —1 lb per 10 gallons liquor); in this way less bright but more covered shades are obtained.

Developing by steaming with admission of air is the method most generally followed in practice, and is easy and simple in its application; full details will be found on pages 129 and 235 of our book on "Cotton Dyeing".

In order to produce bright blue shades, the Immedial Blues are frequently combined with Immedial New Blue, the method of working followed being the same as for Immedial Blue. The dyeings may also be shaded with Immedial Black, Immedial Indone, Immedial Dark Green or Immedial Deep Green.

Immedial Blue C extra conc., CB extra conc., CR extra conc. are dyed exactly like the single strength brands, using however only half the quantities of dyestuff for the same depth of shade; the weight of the other ingredients remains the same as for the single strength brands.

## Immedial New Blue G conc.

100 lbs yarn in about 200 gallons liquor	For pale and medium shades		For deep shades	
	Starting bath	Subsequent lots	Starting bath	Subsequent lots
Dyestuff	6—12 lbs	4—8 lbs	12—20 lbs	8—12 lbs
Sodium sulphide crystals	12—20 „	6—12 „	20—30 „	12—18 „
Caustic soda lye of 75° Tw.	1—2 lbs	3—6 oz	2—4 „	3—6 oz
Common salt or desiccated				
Glauber's salt	4—15 „	0—2 lbs	15—30 „	2—10 lbs

Immedial New Blue is dyed and developed exactly like Immedial Blue and is used frequently in combination with the latter. In many cases dyeings of Immedial New Blue are simply aftertreated with bichromate of potash and sulphate of copper, which method yields very full shades of eminent fastness; Immedial Indogene and Immedial Direct Blue may serve as shading products.

Dye as usual at boiling temperature, squeeze off, rinse, and aftertreat as stated on page 18.

the weight of the yarn. If a more dilute liquor be used, the weights of the ingredients have to be instance, the liquor amounts to 25—30 times the weight of the yarn, the afore- must be increased by one-quarter to one-third,

other ingredients are required whether for a concentrated or more dilute bath,

the dyeings with sulphate of copper and bichromate of potash as per directions on page 18,

dyestuffs see pages 14 and 15.

### Special Method of Dyeing Immedial Indone.

The following method, which is very similar to that of working with Indigo, has given very satisfactory results in practice.

For about 50—100 lbs material, an ordinary dye-vat containing about 100 gallons liquor is used. Five sticks with 2 lbs yarn each are entered into the dyebath one after the other, and given two turns each; a workman then takes the yarn from the stick first entered to wring it off twice at the wringing post fixed just above the vat and hands it to another man who then wrings it off thoroughly. Two pounds of fresh yarn are then entered and so on until the whole lot is passed through.

The dye-vat is heated with indirect steam to about 50° C. (120 deg. F.) and is charged for instance for 100 gallons with

- 4 lbs Immedial Indone R conc.
- $\frac{1}{2}$  „ Immedial Indone 3B conc.
- 12 „ sodium sulphide crystals
- 8 „ glucose
- 5 „ soda ash
- 10 „ desiccated Glauber's salt

previously dissolved and boiled up in about 12 gallons water. First one-half of this solution is added to the dyebath, and 50 lbs of yarn are passed through as described above; then the other half of the dyestuff solution is added and the same lot passed through the bath again in reversed order, entering the last stick first.

For dyeing subsequent lots of 50 lbs each, the standing bath should be strengthened with

- 3 lbs Immedial Indone R conc.
- $\frac{3}{8}$  „ Immedial Indone 3B conc.
- 7 „ sodium sulphide crystals
- 1 „ glucose
- 1 „ soda ash
- 2 „ desiccated Glauber's salt.

This method of working is especially to be recommended if batches of varying size have to be dyed frequently; the levelness of the dyeings obtained is excellent, and yarns dyed thus may without difficulty be used for plain goods.

The whole quantity of the material having been dyed according to the foregoing instructions, the yarn is oxidised for two hours and then aftertreated at 70—80° C. (160—175 deg. F.) with

1 2 0 0 bichromate of potash

2 0 0 sulphate of copper

3 0 0 acetic acid.

### Topping with Basic Colours.

For shading purposes, or in order to ensure greater brightness, a topping with Basic Colours is frequently resorted to, the following dyestuffs being specially suited for this purpose:

New Methylene Blue GG, GB, N, R, 3R

Methylene Blue BB.

For specially red shades, the various brands of Methyl Violet or Crystal Violet 10B are best used; and Naphtindone BB for very deep bronzy blues intended as imitations of dark coppery Indigo shades.

The well rinsed yarn is topped in a cold bath charged with 5—10 0 0 acetic acid or 5—10 0 0 sulphate of alumina, to which the dyestuff is added in several portions. As soon as the bath is exhausted, it is heated to about 60° C. (140 deg. F.) — for Naphtindone BB to the boil — and dyeing continued at this temperature for about another 10—15 minutes; the yarn is then rinsed thoroughly and dried.

It is useful to work the yarn to be topped for some time in the bath charged with acetic acid or sulphate of alumina before adding the requisite Basic Colours, good levelness and good penetration being thus ensured.

### Topping with Indigo.

The blue Immedial Colours are of excellent value when used as a bottom for Indigo, which latter readily combines with these blues and yields very full shades. Especially suitable for



this purpose are the Immedial Direct Blues and Immedial Blue brands which are dyed according to the directions given on the preceding pages. A rinsing subsequent to the dyeing is unnecessary, and the developing by steaming of the Immedial Blues can in most cases be dispensed with. The various vats mentioned on page 19 of our pamphlet No 2490 may all of them be used for topping purposes, yielding equally good results.

### Bottoming with Indigo.

It has in some instances proved advantageous in practice to bottom the yarns in the Indigo vat and then to top them with Immedial Indone, Immedial Direct Blue, Immedial Indogene or likewise with Immedial Blue.

All the above-mentioned dyestuffs are suited for this purpose if applied according to the methods described, but care must be taken that the vat-dyed yarns contain no residues of lime or acids, unlevel dyeings being otherwise apt to result. Any after-treatment or developing necessary is carried out according to the normal instructions.

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## The Dyeing of Mercerised Cotton Yarn.

The affinity of the mercerised cotton fibre to the colouring matter being considerably greater than that of the raw cotton, it is very important to dye at a moderate temperature, to reduce the quantity of dyestuff proportionately and to omit the addition of salt altogether. An addition of Turkey-red oil or monopole soap improves the levelling and the penetration.

## The Dyeing of Linen Yarn.

Linen yarn is dyed exactly like cotton yarn. It is best to boil the yarn well with soda before dyeing. As linen yarn requires generally less colouring matter than cotton, the quantities of dyestuff can be reduced. When dyeing pale shades, or yarns which are difficult to penetrate, it is useful to add some Turkey-red oil ( $1\frac{1}{2}$ —3 oz per 10 gallons liquor) but to omit the salt altogether.

## Range of Indigo Shades.

Light Indigo shades are best produced with Immedial Indogene GCL conc., Immedial Indone 3B conc. and BBF conc., which may be saddened with Immedial Direct Blue B or Immedial Indogene B conc.

For medium shades of Indigo, Immedial Indone BF conc., JBN conc. or R conc. are used and may, if necessary, be saddened with Immedial Direct Blue B.

Deep and reddish shades are dyed with Immedial Indone R conc., RRconc. and Immedial Direct Blue B, and can be saddened with Immedial Black.

If a distinct blue overhand cast is desired, Immedial Indone JBN conc. in combination with Immedial Indone R conc. or RR conc. is used to good advantage. Heavy bronzy shades are produced by topping with Naphtindone.

The fastness of the blue dyeings produced in this manner is excellent and sufficient for all the requirements of the cotton industry; exact details will be found on page 20.

No 1. 1    0/0 Immedial Indogene GCL conc. pat.  
           0,8 0/0 Immedial Indone BF conc. pat.  
           0,2 0/0 Immedial Direct Blue B pat.

No 2. 1,4 0/0 Immedial Indone JBN conc. pat.  
           1,1 0/0 Immedial Indogene GCL conc. pat.  
           0,3 0/0 Immedial Direct Blue B pat.

No 3. 1,8 0/0 Immedial Indone JBN conc. pat.  
           1,4 0/0 Immedial Indogene GCL conc. pat.  
           0,5 0/0 Immedial Direct Blue B pat.

No 4. 4    0/0 Immedial Indone JBN conc. pat.  
           1    0/0 Immedial Direct Blue B pat.

No 5. 4,25 0/0 Immedial Indone JBN conc. pat.  
           1    0/0 Immedial Indone R conc. pat.  
           1,2 0/0 Immedial Direct Blue B pat.

No 6. 5,25 0/0 Immedial Indone JBN conc. pat.  
           1,5 0/0 Immedial Indone R conc. pat.  
           1,75 0/0 Immedial Direct Blue B pat.

No 7. 6    0/0 Immedial Indone JBN conc. pat.  
           2    0/0 Immedial Indone R conc. pat.  
           2,75 0/0 Immedial Direct Blue B pat.

No 8. 7    0/0 Immedial Indone JBN conc. pat.  
           3    0/0 Immedial Indone RR conc. pat.  
           4    0/0 Immedial Direct Blue B pat.

Range of Indigo Shades.

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3



4



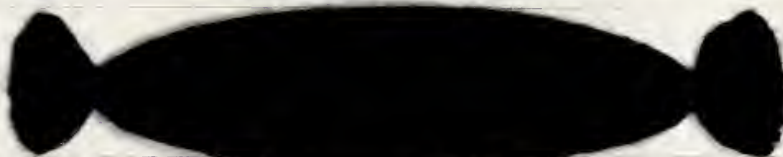
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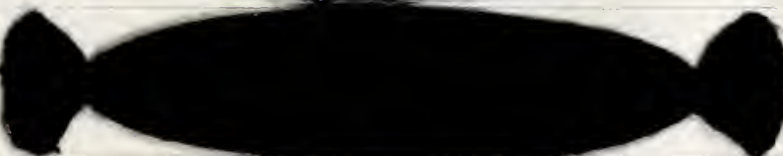
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## Dyeings on Ordinary and on Mercerised Yarn.

The blue Immedial Colours may be used in combination with each other, or with the other Immedial Colours, for the production of a great variety of blue shades which may if necessary be varied still further by a suitable topping with Basic Colours. All shades thus produced are suited for all the purposes of cotton dyeing.

Owing to their excellent fastness to washing, light and rubbing, these products are furthermore especially well suited for dyeing mercerised yarns to be used for embroidery and crochet work.

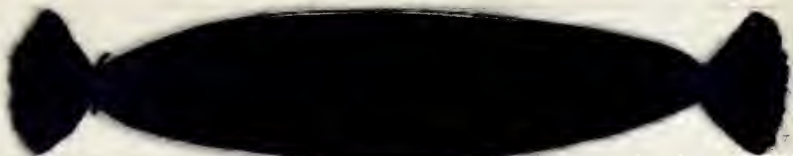
- No 9. 1,8 % Immedial Indone 3B conc. pat.  
1,8 % Immedial Indone BF conc. pat.  
0,2 % Immedial Direct Blue B pat.
- No 10. 5 % Immedial Indone RB conc. pat.  
1 % Immedial Indone RR conc. pat.  
aftertreated with  
sulphate of copper  
bichromate of potash (page 18).
- No 11. 6 % Immedial Direct Blue B pat.  
2 % Immedial Black NN conc.
- No 12. 5 % Immedial Indone RG conc. pat.  
3 % Immedial Green BB extra.
- No 13. 4 % Immedial Indone RR conc. pat.  
3 % Immedial Violet C  
topped with  
0,2 % Crystal Violet 10 B.
- No 14. 6 % Immedial Direct Blue B pat.  
1,5 % Immedial Dark Green B.
- No 15. 3,5 % Immedial Indogene GCL conc. pat.
- No 16. 5 % Immedial Indone BN conc. pat.

Dyeings on Ordinary and on Mercerised Yarn.

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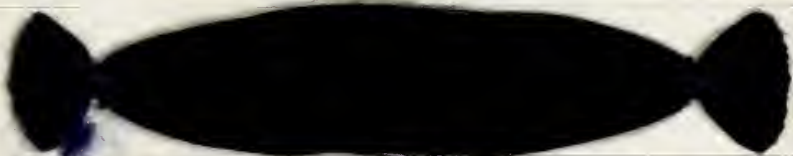
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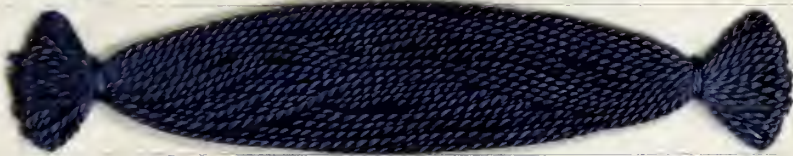
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### Blues developed by Steaming.

The Immedial Blue brands developed by steaming deserve special attention on account of their eminent fastness to washing and their low cost. By suitably shading with Immedial New Blue G conc., Immedial Dark Green or Immedial Black, or by topping with Basic Colours, dyeings of the most excellent fastness may be produced at an exceedingly low cost.

The process of developing by steaming is carried out easily and simply as per details given on page 129 of our book on "Cotton Dyeing".

No 17. 3 ‰ Immedial New Blue G conc. pat.  
0,5 ‰ Immedial Blue C pat.

No 18. 4,5 ‰ Immedial New Blue G conc. pat.  
1,5 ‰ Immedial Blue CB pat.

No 19. 5 ‰ Immedial New Blue G conc. pat.  
5 ‰ Immedial Blue CR pat.

No 20. 12 ‰ Immedial Blue CR pat.

No 21. 12 ‰ Immedial Blue CR pat.  
4 ‰ Immedial Black NB pat.

No 22. 7 ‰ Immedial Blue C pat.  
1 ‰ Immedial Dark Green B  
topped with  
0,2 ‰ New Methylene Blue GG pat.

No 23. 9 ‰ Immedial Blue CR pat.  
topped with  
0,1 ‰ Methyl Violet B No. I.

No 24. 8 ‰ Immedial Blue CR pat.  
topped with  
0,1 ‰ New Methylene Blue R pat.

Blues developed by Steaming.

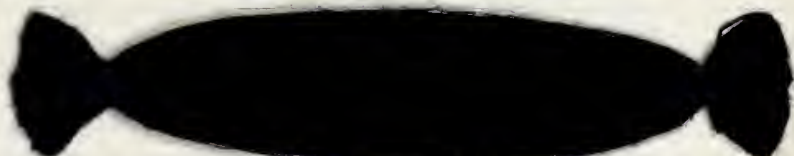
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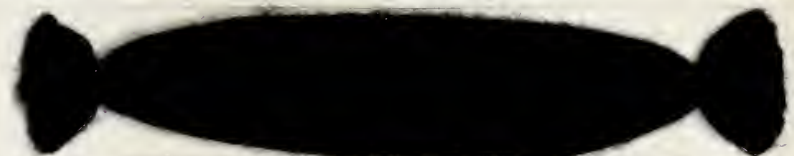
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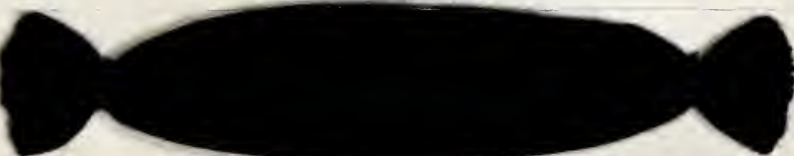
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### Dyeings topped with Indigo.

The Immedial Blues and Immedial Direct Blues are extensively employed for bottoming Indigo-vat-blue. In this way dyeings are produced of exceedingly good fastness to washing and rubbing, and which offer the additional advantage of a low cost. Immedial Colours are likewise used frequently for topping Indigo dyeings, especially pale shades, in order to improve their defective levelness.

- No 25. 7 % Immedial Blue C pat. (topped with Indigo).
- No 26. 4 % Immedial Indogene GCL conc. pat.  
(topped with Indigo).
- No 27. 13 % Immedial Blue CB pat. (topped with Indigo).
- No 28. 4,5 % Immedial Direct Blue JB pat.  
(topped with Indigo)  
topped with  
0,2 % New Methylene Blue 3R pat.  
aftertreated with  
3 % sulphate of copper.

### Linen Yarn.

Linen yarn is nowadays dyed extensively with direct blues and with blues to be developed by steaming, because the fibre is easily and thoroughly penetrated and the dyeings possess excellent fastness to washing, light and acids.

- No 29. 2 % Immedial Indone BBF conc. pat.  
topped with  
0,15 % New Methylene Blue GG pat.
- No 30. 5 % Immedial Indogene GCL conc. pat.
- No 31. 7 % Immedial Blue CB pat.  
topped with  
0,15 % New Methylene Blue N.
- No 32. 4,5 % Immedial Direct Blue JB pat.  
2 % Immedial Direct Blue B pat.

Dyeings topped with Indigo.

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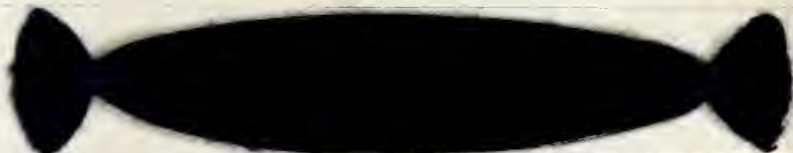
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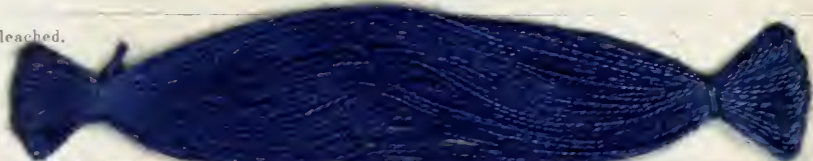
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Linen Yarn.

bleached.

29



bleached.

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Machine-Dyeing.

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## Machine-Dyeing.

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There are mainly two systems according to which the **Machines.** blue Immedial Colours are dyed in machines, viz.

- I. The Packing System
- II. The Spindle System.

In both systems the dye-liquor is made to circulate through the goods either by means of a pump, or by suction or air pressure, or again by steam pressure.

The dyeing machines may consist of wood, iron or nickeline, but never of copper; any copper, bronze or brass fittings should be replaced by such of iron, lead or nickeline.

The circulation of the liquor should be so regulated as to avoid any sudden spouting, and the goods to be dyed should always be completely covered by the liquor.

For dyeing with the blue Immedial Colours it is of great importance to have machines fitted with good appliances for effective suction or pressing off, as well as for rinsing, which allow of removing the liquor effectively after dyeing, and of a good rinsing of the goods subsequently.

For drawing off the liquor by suction the pump is mostly used. An appliance for air suction if available is used to advantage owing to its more rapid and efficacious working; otherwise a steam-injector may be used to free the cotton as well as possible from the dye-liquor.

When using machines of the packing system combined with a hydroextractor, the whizzing should take place as soon as possible after the dyeing.

Quality of the  
Water.

It is of primary importance in machine-dyeing to use water as free from lime as possible. Calcareous water may also be used in many cases, but level results are obtained with greater certainty when working with pure water.

So much depends upon local conditions in the supply of soft water that no hard and fast rule can be given as to how it can be obtained. It may however be mentioned that in a great many works a good supply of soft water sufficient for the moderate requirements of machine-dyeing can easily be procured by simply collecting the condensed water which is forthcoming in every dye-house.

Where sufficient condensed or other soft water is not available, a small water-purifying plant of the kinds constructed by a number of engineering firms should be put up.

Dissolving the  
Dyestuffs and  
other  
Ingredients.

It is most essential that the dyestuffs and other ingredients are thoroughly dissolved before being added to the dyebath; it is best to filter the solutions through some cotton cloth before adding them to the dyebath.

Full details regarding the dissolving are given on pages 14 and 15.

Pure  
Chemicals.

Special attention should also be paid to the use of pure materials in dyeing.

Soda ash is in most cases of a sufficiently pure quality, whereas salt is best used in the form of crystallized Glauber's salt.

Sodium sulphide frequently leaves a black residue on dissolving which may be disturbing when dyeing pale shades. It is therefore best to filter off the solutions or to prepare a concentrated standard solution which is allowed to settle before being used.

Wetting out  
of the Goods.

It is not as a rule necessary to wet out or boil the goods, but when dyeing at a low temperature it is well to first treat the goods for some minutes in a boiling hot bath containing soda, Turkey-red oil or monopole soap.

The following remarks refer to the dyeing of the cotton in its various stages of manufacture.

### Loose Cotton.

Loose cotton is dyed exclusively in machines working according to the packing system; the dyeing is generally conducted near boiling temperature, the dyebath being charged as indicated in the tables further on.

Dyeing being completed, the liquor is drawn off either by suction by means of a pump, or pressed off with steam or air pressure, or removed by hydroextracting, depending on the construction of the machine.

The dye-liquor having been removed,

Dyeings of Immedial Indone, Immedial Indogene and Immedial Direct Blue are immediately rinsed with cold water;

Dyeings of Immedial Blue and Immedial New Blue are either steamed in the machine with the admission of air or developed to blue by smothering.

If cotton dyed with Immedial Indone, Immedial Indogene or Immedial New Blue be freed from the adhering liquor and be left to oxidise by exposure to the air before rinsing, somewhat redder and deeper shades result than are obtained by rinsing immediately.

### Sliver and Roving.

Sliver and roving are dyed in a variety of forms, more especially:

a) *Loosely wound*, in the same kinds of machines as loose cotton; the dyeing directions are also the same, except that a temperature of about 70—80° C. (160—175 deg. F.) is not exceeded so as to leave this tender material in as good condition as possible.

b) *In the form of bobbins* as so-called Flyer-Sloeving-bobbins, in machines of the spindle system. This system offers the advantage that the sliver may be dried straightaway on the spindles.

In this case also the dyeing is best carried out at a temperature not exceeding 70—80° C. (160—175 deg. F.).

Zinc or nickel-plated iron spindles are used to most advantage. See instructions given below for cheeses and cops.

c) *As sliver with a continuous passage.* As the dyeing takes place in very short passages only, the dyebaths have to be considerably more concentrated than is usual. As a rule the directions given on page 92 for dyeing piece-goods in the padding machine may be followed; further particulars will on application readily be communicated.

## Cheeses and Cops.

Dyeing by  
the Packing  
System.

When dyeing by the *packing system*, special care must be taken in packing the goods, filling the interstices up well either with loose cotton or cotton waste and pressing hard subsequently. Granular sand is also sometimes used as a filling material, according to a patented process of G. de Keukelaere, Brussels (British Patent No 13395<sup>01</sup>).

For filling up the paper tubes, either skewers or small tubes of zinc or nickeline are used, sometimes also skewers of hard rubber or wood. They are best removed from the tubes before drying. The dyeing is carried out according to the instructions given for loose cotton on page 57.

Dyeing by  
the Spindle  
System.

When dyeing on *spindles*, the cops and bobbins are put on perforated or wire spindles, it being a matter of course that the tubes on which the cops or bobbins are wound are likewise perforated.

No alum or sulphate of alumina should be contained in the material used for the paper tubes (as frequently happens), bronzy spots on the yarn being apt to result therefrom.

Spindles made of zinc, nickel-plated metal or nickeline are used; iron spindles are not so well adapted owing to their liability to rust.

When dyeing on spindles, it sometimes occurs, more especially in the case of pin cops and warp cops, that cotton fibres, etc. clog the points of the spindles and thus cause an uneven penetration of the cops; this is the more unpleasant since this fault is not noticed until during the weaving. It is therefore recommended to clean the spindles from time to time by heating them in a soldering flame or a Bunsen burner and rinsing them subsequently in the machine with hot water. Some machines are so built as to allow of reversing the circulation of the liquor, thus preventing the spindles from becoming clogged.

Pale and bright shades are best dyed at a temperature of 30 - 50° C. (85 - 120 deg. F.), with Immedial Indone and in some instances also with Immedial Indogene GCL conc.

More covered shades are dyed at boiling temperature; details regarding the charging of the dyebaths will be found in the tables further on.

Under any circumstances it is of great importance to free the material thoroughly and as soon as possible after dyeing from any excess liquor, which is best effected either by means of a pump or vacuum alone, or followed by pressing off with air.

The cops or cheeses having been freed of the excess liquor,

Materials dyed with Immedial Indone, Immedial Indogene and Immedial Direct Blue are at once rinsed well with cold water;

Dyeings produced with Immedial Blue and Immedial New Blue are developed by steaming in the machine proper. Dyeings on cheeses may also be developed by smothering (see page 18).

If there should be no appliances available for freeing the goods thoroughly from the liquor according to one or the other of the methods described above, materials dyed with Immedial Indone, Immedial Direct Blue or Immedial Indogene are very thoroughly rinsed with a copious supply of water, adding to the first rinsing bath about 1 lb common salt and  $\frac{3}{4}$ —1½ oz sodium sulphide crystals per 10 gallons water.

By adding to the last rinsing bath 3—4½ oz peroxide of hydrogen and ⅓—⅓ oz ammonia per 10 gallons water, allowing this liquor to act in the cold for several minutes and finally heating to about 40—50° C. (105—120 deg. F.), somewhat brighter shades may be obtained and the oxidation of the Immedial Indone, Immedial Indogene and Immedial Direct Blue dyeings be facilitated.

In order to produce very bright dyeings, it is quite usual to treat the goods finally in a bath heated to about 70—80° C. (160—175 deg. F.) and containing about 3 oz soap and 3—4½ oz potato starch per 10 gallons liquor.

### Cotton Yarn.

Cotton yarn is dyed in the same machines and according to the same instructions as given for loose cotton. The hanks must be packed evenly and tightly enough in order to prevent the formation of any channels during the dyeing operation, which might easily cause unlevel results.

The yarn having been dyed, rinsed and hydroextracted, is best left lying in the wet state for several hours or over night, to promote thorough and even developing. The same effect is obtained by treating the yarn in the last rinsing bath with some peroxide of hydrogen and ammonia (see above); if necessary the yarn may finally be brightened with soap.

Cotton yarn dyed with Immedial Blue and Immedial New Blue G conc. is best developed by steaming with the admission of air as indicated on pages 61 and 62.

### Warps.

Warps are dyed in machines either on beams or by the packing system.

Beamed warps are dyed generally on the same lines as cops.



As warps dyed on the beam offer technical advantages also in sizing, this method of working is steadily gaining in favour.

When dyeing warps in machines according to the packing system, they are packed and dyed exactly like yarns as per the aforementioned instructions.

### The Developing of Immedial Blue and Immedial New Blue G conc.

These products are developed

- a) by Smothering, or
- b) by Steaming with the admission of air.

The *developing by smothering* is principally resorted to with loose cotton, sliver, roving, cheeses and beamed warps.

After dyeing and removing the excess liquor by suction, pressing off or whizzing, the material is put into baskets or any other kind of receptacle (boxes, etc.), wrapped up in or covered with a cloth saturated with dye-liquor in order to prevent partial drying, and placed for several hours or over night in a drying room.

The blue is in this manner best developed at a temperature of about 60—70° C. (140—160 deg. F).

After developing, the goods are rinsed with lukewarm water and if necessary soaped. The rinsing of loose cotton may if desired be carried out in the washing machine.

The *developing by steaming* is carried out either in the dyeing machine or in a special steam-chest of the kind described on pages 235 and 236 of our book on "Cotton Dyeing". The goods are therein subjected to the action of steam and air, a method applicable to any kind of material. *Special care must be exercised to see that the goods before developing are freed thoroughly from the dye-liquor by pressing off, suction or whizzing.*

If the developing is carried out in the dyeing machine, a steam pipe provided with the air injector should be attached to the machine so as to make the steam penetrate the material completely from the outside to the interior and vice versa if possible.

If in some machine or other the loose material, cheeses and yarns cannot be sufficiently freed from the liquor by pressing off, suction or whizzing, it is best after dyeing to rinse for a few minutes in a *cold* liquor containing

3 oz caustic soda lye of 75 deg. Tw.	} per 10 gallons liquor,
1½ „ sodium sulphide crystals	
1 lb common salt	

and then to hydroextract. After the latter manipulation the receptacle containing the material is returned into the machine, the blue being then developed by steaming.

The duration of the steaming process is about ½ hour. Too prolonged steaming should be avoided, because it affects the fastness to washing, although somewhat brighter blues are thus obtained. After steaming, the goods are rinsed thoroughly in warm water and if necessary soaped.

#### Aftertreatment with Metallic Salts.

This is necessary only in very rare cases, but may be applied, if desired, to increase the fastness to light, washing and boiling.

The goods are aftertreated with

- 2—3% sulphate of copper,
- 1 2—1% bichromate of potash and
- 3—4% acetic acid

for 20—30 minutes at 70—80° C. (160—175 deg. F.)

When aftertreating in the dyeing machines it should be borne in mind that the iron apparatus mostly in use for Immedial Colours are not suitable for this purpose, as the copper is precipitated by the iron. The aftertreatment should therefore be carried out in machines consisting either of wood, copper or nickeline; loose cotton and yarn may also be aftertreated in the dye vat.

### Topping with Basic Colours.

This is generally carried out by adding 5—10% acetic acid to the cold bath, leaving the previously dyed and rinsed material for a few minutes in this bath, and then adding the previously well dissolved dyestuff in several portions. When the bath is nearly exhausted, the temperature is slowly raised to the boil.

If only slight quantities of Basic Colours are used for topping, this operation is best carried out in quite a weak, lukewarm soap bath.

Immedial Indone 3B conc., B conc., BBF conc., BF conc.,  
BN conc., JBN conc., R conc., RR conc., RG conc., RB conc.

	For pale and medium shades		For deep shades	
	Starting bath per 10 gallons liquor	Subsequent lots (of the weight of the goods)	Starting bath per 10 gallons liquor	Subsequent lots (of the weight of the goods)
Dyestuff	3 oz—1 lb 3 oz	1 — 6 ‰	1 lb 3 oz—2 lbs	6 — 10 ‰
Sodium sulphide cryst.	6 „ — 2 „, 6 „	2 — 12 ‰	2 „, 6 „ — 4 „	12 — 20 ‰
Glucose	3 „ — 1 „, 3 „	0,4 — 1,2 ‰	1 „, 3 „ — 2 „	1,2 — 2 ‰
Soda ash	4½ „ — 8 „	0,5 — 1 ‰	4½ „, — 1½ lb	0,5 — 1 ‰

Dyeing generally lasts for  $\frac{1}{2}$ — $\frac{3}{4}$  hour, with pale shades at 30—40° C. (85—105 deg. F.), with deep shades at 70—80° C. (160—175 deg. F.).

After dyeing, the goods are freed at once from any excess liquor by means of suction, pressing off or whizzing, a thorough and even removal of the liquor being essential to ensure levelness of the dyeings.

The material is then rinsed at once, if necessary with the addition of some peroxide of hydrogen (see page 60).

Combinations of Immedial Indone with Immedial Direct Blue are best dyed at a temperature of about 70—80° C. (160—175 deg. F.).

## Immedial Indogene GCL conc., B conc.

	For pale and medium shades		For deep shades	
	Starting bath per 10 gallons liquor	Subsequent lots (of the weight of the goods)	Starting bath per 10 gallons liquor	Subsequent lots (of the weight of the goods)
Dyestuff	3 oz - 1 lb 3 oz	1 - 6 0/0	1 lb 3 oz - 2 lb	6 - 10 0/0
Sodium sulphide cryst.	6 „ - 2 „, 6 „	2 - 12 0/0	2 „, 6 „ - 4 „	12 - 20 0/0
Soda ash	4 1/2 „ - 8 „	0,5 - 1 0/0	4 1/2 „ - 8 oz	0,5 - 1 0/0
Crystallized Glauber's salt	0 „ - 8 „	0 - 1 0/0	8 „ - 1 lb	1 - 3 0/0

Dyeing is generally conducted for  $\frac{1}{2}$  - 1 hour near boiling temperature.

After dyeing, the cotton is freed well from the liquor by suction, pressure or hydroextracting, and then rinsed immediately.

Immedial Indogene GCL conc. yields somewhat brighter and more greenish shades when dyed at about 50° C. (120 deg. F.).

Both brands yield somewhat redder and deeper shades if dyed with the addition of glucose (about the same weight as of dyestuff for the starting bath and  $\frac{1}{4}$  -  $\frac{1}{5}$ th of the quantity of dyestuff for the subsequent lots).

### Immedial Direct Blue B, JB, R, OD.

	For pale and medium shades		For deep shades	
	Starting bath per 10 gallons liquor	Subsequent lots (of the weight of the goods)	Starting bath per 10 gallons liquor	Subsequent lots (of the weight of the goods)
Dyestuff	3 oz—1 lb	1,25—6 0/0	1 lb—1 lb 10 oz	6 —10 0/0
Sodium sulphide cryst.	4 1/2 „—1 „	1,5 —6 0/0	1 „—1 „ 10 „	6 —10 0/0
Soda ash	4 1/2 „—1 1/2 „	0,5 —1 0/0	4 1/2 oz— 8 „	1 1/2 — 1 0/0
Crystallized Glauber's salt	0 —1 1/2 „	0 1 0/0	8 „ — 1 lb	1 — 3 0/0

Dyeing is conducted for 1/2—1 hour near boiling point.

After dyeing, the cotton is freed well from the liquor by suction, pressure or hydroextracting, and then rinsed immediately.

Somewhat more purplish and brighter shades are obtained by a treatment in a hot bath containing 1 1/2—3 oz soda and 1 1/2—3 oz soap per 10 gallons liquor.

Combinations of Immedial Direct Blue and Immedial Indone are to advantage dyed on cops, cheeses and cotton yarn best at a temperature of only about 70—80° C. (160—175 deg. F.).

Immedial Direct Blue B extra conc. and JB extra conc. are dyed like the single strength brands, requiring however only half the weight of dyestuff; the weights of the other ingredients remain the same.



## Immedial Blue C, CB, CR.

	For pale and medium shades		For deep shades	
	Starting bath per 10 gallons liquor	Subsequent lots (of the weight of the goods)	Starting bath per 10 gallons liquor	Subsequent lots (of the weight of the goods)
Dyestuff	3 oz—1 lb	1 —6 0/0	1 lb—2lbs	6 —12 0/0
Sodium sulphide crystals	3 „—1 „	1 —6 0/0	1 „—2 „	6 —12 0/0
Caustic soda lye of 75 deg. Tw	3/4 „—1 1/2 oz	0,1—0,2 0/0	1 1/2 oz—3 oz	0,2— 0,3 0/0
Cryst. Glauber's salt	0 —8 „	0 —1 0/0	8 „—1 lb	1 — 3 0/0

These brands are generally dyed for 1/2—1 hour near boiling temperature; the excess liquor is then removed as thoroughly as possible by suction, pressing off or whizzing, without rinsing, and the goods are developed to blue by steaming or smothering (see page 61). After developing, rinse thoroughly in a hot bath, and soap if necessary.

In the place of caustic soda lye 1/2—1 lb soda ash per 10 gallons liquor may also be used, in which case however dyeings of a less bright and more covered shade are obtained.

Immedial Blue in combination with Immedial New Blue G conc. may to advantage be used for producing bright greenish blue shades, or it may be shaded with Immedial Indone or Immedial Direct Blue, or saddened with Immedial Black.

Immedial Blue C extra conc., CB extra conc. and CR extra conc. are dyed like the single strength brands except that only half the quantity of dyestuff is required, the weight of the other ingredients remaining the same.

## Immedial New Blue G conc.

	For pale and medium shades		For deep shades	
	Starting bath per 10 gallons liquor	Subsequent lots (of the weight of the goods)	Starting bath per 10 gallons liquor	Subsequent lots (of the weight of the goods)
Dyestuff	3 oz—1 lb	1 —6 0/0	1 lb—2lbs	6 —12 0/0
Sodium sulphide crystals	6 „—1 1/2 „	2 —9 0/0	1 1/2 „—3 „	9 —18 0/0
Caustic soda lye of 75 deg. Tw.	3/4 „—1 1/2 oz	0,1—0,2 0/0	1 1/2 oz—3 oz	0,2— 0,3 0/0
Cryst. Glauber's salt	3/4 „—8 „	0 —1 0/0	8 „—1 lb	1 — 3 0/0

Immedial New Blue G conc. is dyed and developed exactly like Immedial Blue and may be used in combination with same; if necessary Immedial Indone R conc. or RR conc. are used for shading towards red.

Instead of developing by steaming or smothering, Immedial New Blue G conc. may be aftertreated with bichromate of potash and sulphate of copper, whereby darker shades of eminent fastness to washing and light are obtained.

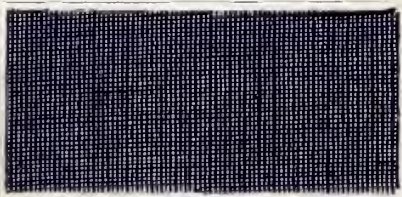
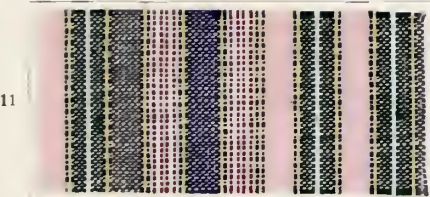
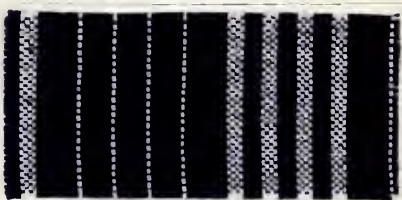
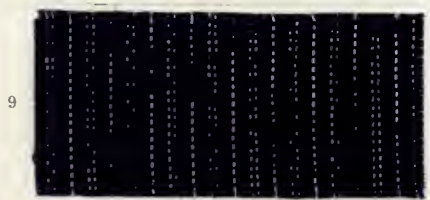
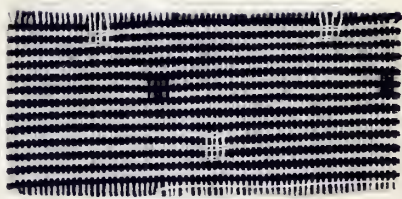
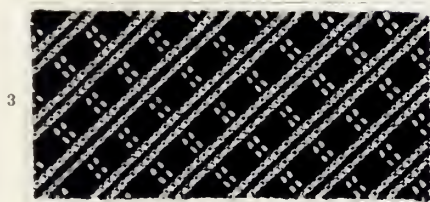
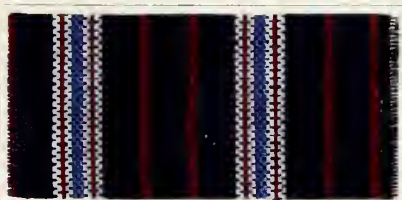
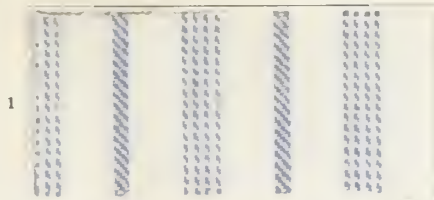
The goods are in such case rinsed immediately after dyeing or removing the liquor, etc. and aftertreated with bichromate of potash and sulphate of copper as indicated on page 62. Immedial New Blue G conc. when treated in this way may be used in combination with any other Immedial Colour.

## Fashionable Fabrics.

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- No 1. Immedial Indogene GCL conc. pat.
- No 2. Immedial Blue C pat.  
Red: Paranitraniline Red.  
Pale Blue: Diamine Sky Blue.
- No 3. Immedial Blue CR pat.
- No 4. Immedial Indone R conc. pat.
- No 5. Immedial Indone RG conc. pat.  
Red: Turkey Red.
- No 6. Immedial Indone RB conc. pat.
- No 7. Immedial Indone RB conc. pat.
- No 8. Immedial Indone R conc. pat.
- No 9. Immedial Indone R conc. pat.
- No 10. Immedial Indogene B conc. pat.
- No 11. Immedial Indone R conc. pat.  
Black: Immedial Black NN conc.  
Yellow: Immedial Yellow D pat.  
Pink: Diamine Rose BG pat.  
Red: Safranine GGS  
Thioflavine T.  
Green: New Methylene Blue N  
Indazine GB  
Thioflavine T.
- No 12. Immedial Indone R conc. pat.

Fashionable Fabrics.



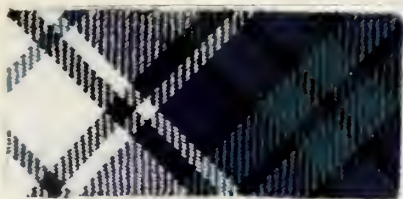
Fashionable Fabrics.

- No 13. Immedial Blue CR pat.  
Green: Immedial Green GG extra  
Black: Immedial Black NNR conc.
- No 14. Immedial New Blue G conc. pat.  
Black: Immedial Black NN conc.
- No 15. Immedial Indogene GCL conc. pat.
- No 16. Immedial Indogene GCL conc. pat.  
Brown: Immedial Brown BR pat.
- No 17. Immedial Indone R conc. pat.
- No 18. Immedial Indone R conc. pat.
- No 19. Immedial Blue CR pat.  
Black: Immedial Black NN conc.
- No 20. Immedial Indogene GCL conc. pat.
- No 21. Immedial Indone R conc. pat.
- No 22. Immedial Blue C pat.  
Red: Paranitraniline Red  
Pale Blue: Diamine Sky Blue.
- No 23. Pale Blue: Immedial Sky Blue Paste pat.  
Dark Blue: Immedial Indone R conc. pat.  
Black: Immedial Black NN conc.  
Yellow: Immedial Yellow D pat.  
Dull Green: Immedial Indone R conc. pat.  
Immedial Yellow D pat.  
Red: Safranin GGS  
Thioflavine T.
- No 24. Immedial Indone R conc. pat.

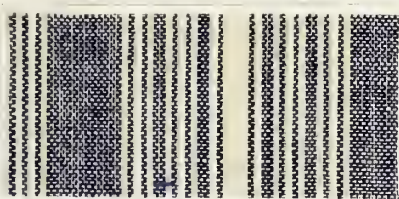


Fashionable Fabrics.

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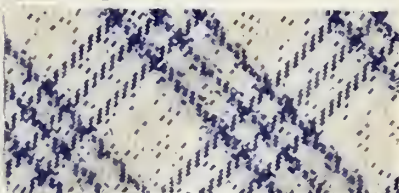
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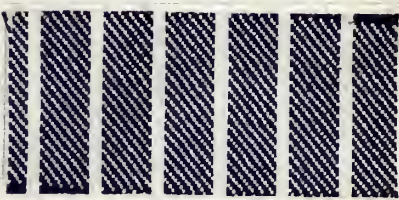
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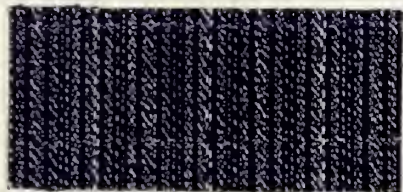
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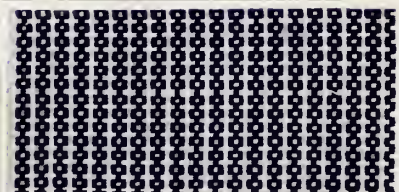
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## Fashionable Fabrics.

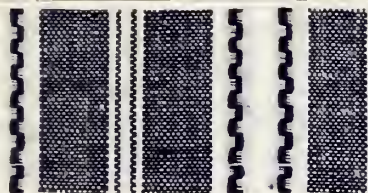
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- No 25. Immedial Indogene B conc. pat.  
Immedial New Blue G conc. pat.  
aftertreated with  
bichromate of potash and sulphate of copper.
- No 26. Immedial Sky Blue Paste pat.  
Black: Immedial Black FF extra pat.
- No 27. Immedial Blue C pat.
- No 28. Immedial Indone R conc. pat.
- No 29. Immedial Indone BBF conc. pat.
- No 30. Medium Blue: Immedial Indone R conc. pat.  
Dark Blue: Immedial Direct Blue B pat.
- No 31. Pale Blue: Immedial Indone 3B conc. pat.  
Dark Blue: Immedial Direct Blue B pat.
- No 32. Immedial Blue CR pat.  
Yellow: Diamine Fast Yellow B pat.  
Red: Turkey Red.
- No 33. Immedial Indone 3B conc. pat.
- No 34. Immedial Indone R conc. pat.
- No 35. Dark Blue: Immedial Indone R conc. pat.  
Pale Blue: Immedial Sky Blue Paste pat.  
aftertreated with  
bichromate of potash and sulphate of copper.  
Black: Immedial Black NN conc.  
Yellow: Immedial Yellow D pat.  
Dull Green: Immedial Indonc R conc. pat.  
Immedial Yellow D pat.  
Red: Safranine GGS  
Thioflavine T.
- No 36. Immedial Indone R conc. pat.

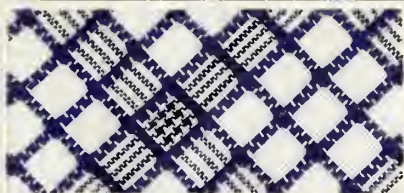


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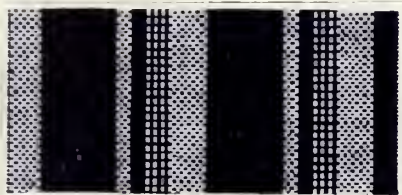
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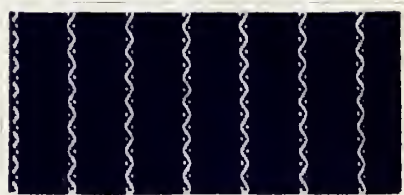
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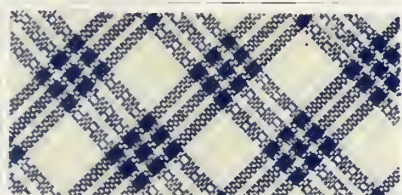
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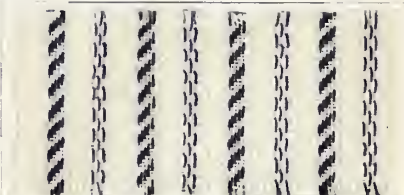
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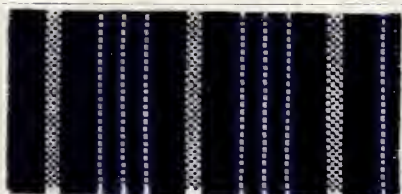
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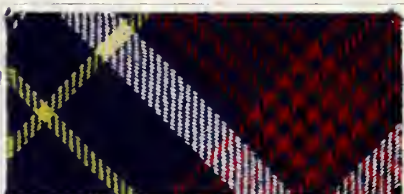
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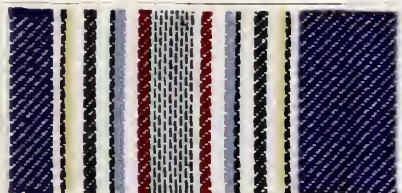
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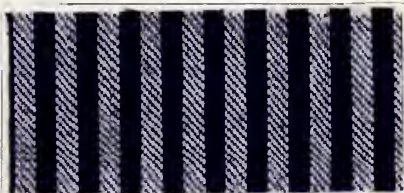
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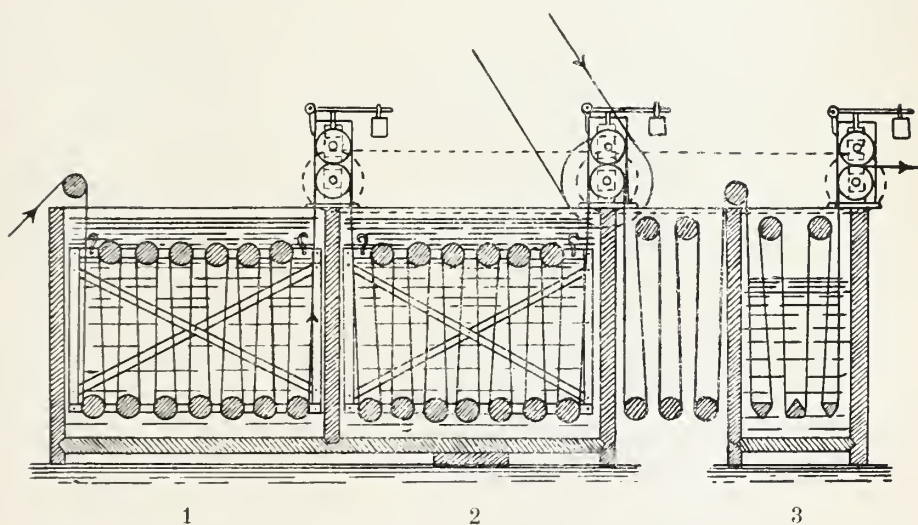
The Dyeing of Warps in Chains.



## The Dyeing of Warps in Chains.

Warps in chains are dyed in the well-known roller boxes or continue-machines; according to the size of the machine, one or at the most two passages prove sufficient.

The following sketch shows one of the warp-dyeing machines most commonly used for dyeing any of the blue Immedial Colours.



Box 1 and 2 contain the dye liquor and the third box the rinsing liquor, each being provided with efficient squeezing rollers. Between the second and third box appliances are provided for giving the warps an air passage if necessary (see below).

The dye-vats are charged with

$1\frac{1}{2}$ — $1\frac{1}{2}$ lbs dyestuff and the requisite quantity	}	per 10 gallons liquor.
of sodium sulphide cryst. (page 13)		
$1\frac{1}{2}$ —3 oz caustic soda lye of 75 deg. Tw.		
$1\frac{1}{2}$ — $1\frac{1}{2}$ lbs common salt or desiccated		
Glauber's salt		

During the dyeing the bath is strengthened with

2—8 % dyestuff and the requisite quantity of sodium sulphide cryst. (page 13)	} of the weight of the goods.
$\frac{1}{2}$ —1 % caustic soda lye of 75 deg. Tw.	

Immedial Indone R conc., RR conc., RG conc., RB conc. and the Immedial Indogene brands dyed with the addition of glucose (same weight as of dyestuff for the starting and  $\frac{1}{4}$ th— $\frac{1}{5}$ th of the weight for the subsequent baths) yield somewhat more reddish and fuller shades.

The warps are first boiled or wetted out well and then squeezed off or hydroextracted, whereupon they are dyed in one or two passages, pale and bright shades with Immedial Indone and Immedial Indogene GCL conc. at 30—50° C. (85—120 deg. F.), deep and more covered shades at boiling temperature. After dyeing it is essential always to squeeze off very thoroughly.

Dyeings of Immedial Indone are then given an air passage of about 10—20 yards by being run over the guiding rollers as illustrated in the above sketch, and only then are they rinsed.

Dyeings of Immedial Direct Blue and Immedial Indogene may be rinsed immediately or after a short air passage if required.

Dyeings of Immedial Blue and Immedial New Blue are not rinsed, but after a thorough squeezing off are developed to blue either by steaming, or, as is mostly the case, by smothering, as per instructions given on pages 18 and 305—306 of our book on "Cotton Dyeing". When developed, the goods are rinsed hot, and dried.



The aftertreatment of dyed warps with metallic salts and the topping with Basic Colours is best done in a special machine.

For details regarding the dyeing of warps in machines see page 60.



## The Dyeing of Piece-Goods.

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## The Dyeing of Piece-Goods.

Piece-goods are dyed:

- a) in the jigger,
- b) in the padding machine,
- c) in the continue-machine.

Dyeing in the jigger is the method most generally adopted and as a rule yields the best results.

Dyeing in the padding machine is resorted to chiefly for the production of pale and medium shades, one or two passages being in most cases sufficient for producing dyeings of excellent fastness.

The continue-machine on account of its great working capacity is used in the first place for producing staple shades such as black, brown and blue, particularly on light fabrics which require one passage only.

Machines used for dyeing must not contain any parts made of copper or brass which may come into contact with the dye-liquor. The troughs or boxes of the respective machines should consist of wood or iron, and the dyebaths should be heated with steam coils of iron or lead.

### a) Dyeing in the Jigger.

When dyeing in the jigger it is most essential that the goods are very thoroughly squeezed off after dyeing, so-called Immedial Jiggers provided with squeezing rollers being most in use.

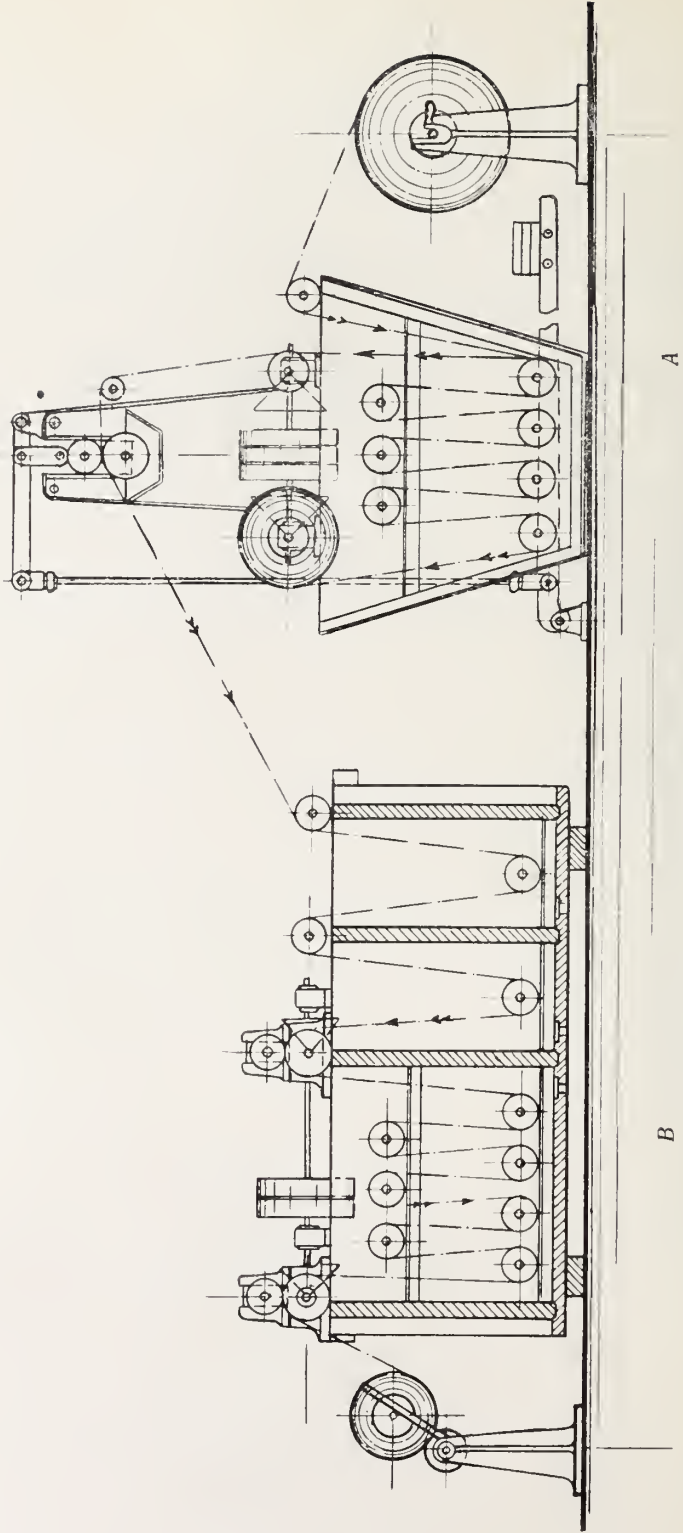
These jiggers are constructed exactly like the ordinary jiggers for Diamine Colours, but are in addition provided with squeezing rollers, thus allowing of the goods being evenly

squeezed off and rinsed immediately, or, as is necessary with Immedial Indone, being first oxidised after dyeing by an air passage. For the latter purpose some guiding rollers are fixed alongside or above the jigger, which allow of the goods passing through the air for 10—20 yards.

The jigger in which the goods are dyed always completely covered by the liquor is used only for materials which are difficult to dye through and therefore require prolonged dyeing.

On the following pages we give some sketches of the various jiggers most generally in use.

# Jigger for Immedial Colours and Broad Washing Machine built by J. P. Bemberg, A. G., Barmen.





The goods are passed over a guiding roller into the iron jigger (*A*) in which they run from one batching roller to the other until the dyeing is complete; they then pass the squeezing appliance fixed above the jigger and are beamed, or passed direct into the full-width washing machine (*B*) if such is attached to the jigger.

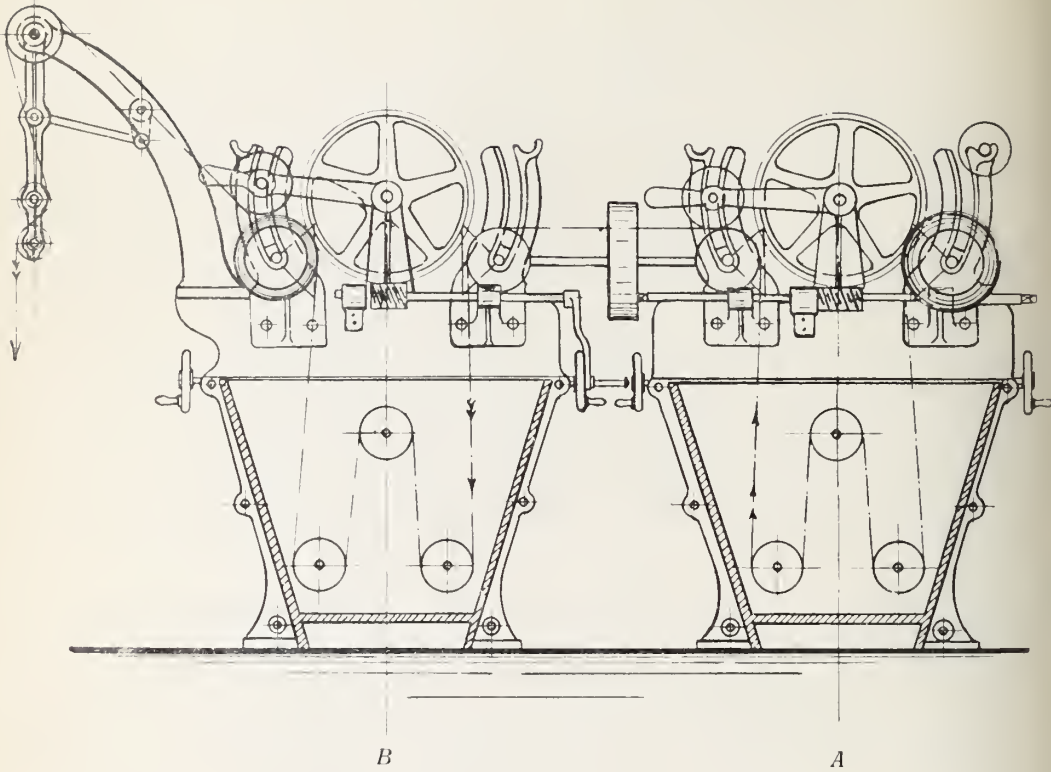
The jigger is provided with four lower and three upper guiding rollers, to allow of immersing as large a batch as possible in the dye-liquor. For greater convenience in working, the jigger should be partly sunk into the floor.

The box of the full-width washing machine is made of pitch pine wood. The first partition serves for washing out the dyestuff (the liquor may be added to the dyebath), the next partition for a treatment with soda, and the third and largest partition, containing the three upper and four lower guiding rollers, is used for rinsing. Both before passing into and when leaving this last compartment, the goods pass the nippers fixed there, consisting of a pair of cast iron rollers, the lower one without covering and the top one covered with rubber.

If this machine is to be used for dyeing Immedial Indone, some guiding rollers are arranged between the jigger and the washing machine, over which the goods are passed for oxidising in the air.

## Double Jigger for Immedial Colours

built by Fr. Gebauer, Berlin NW.



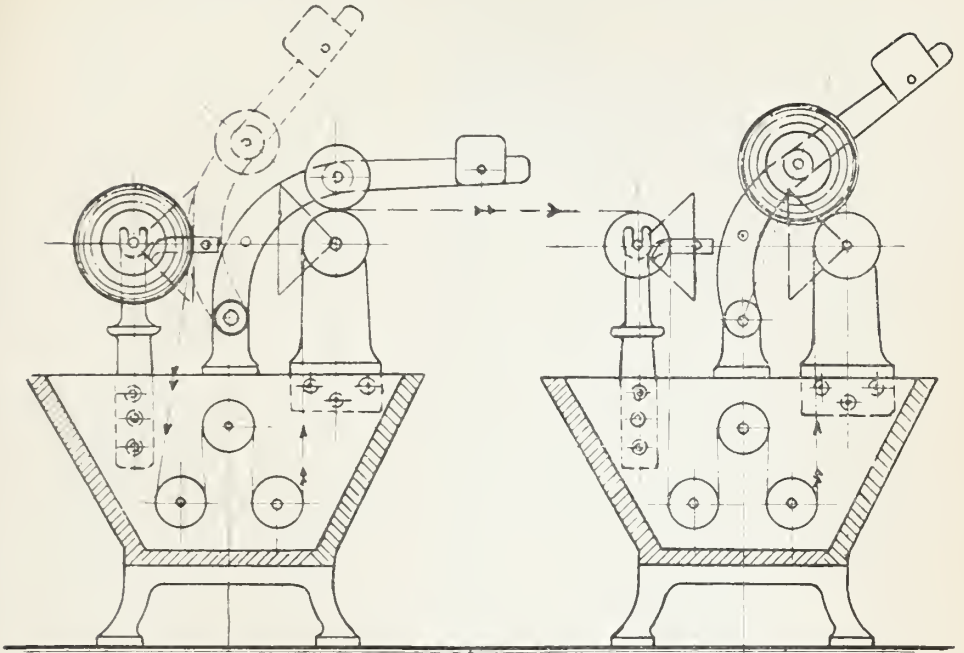
The first jigger (*A*) serves for dyeing, the second (*B*) for rinsing.

When dyeing Immedial Indone, a few guiding rollers for an air passage are fixed between the two jiggers.

The two jiggers are placed sufficiently wide apart from each other so as to allow of a good space for working.

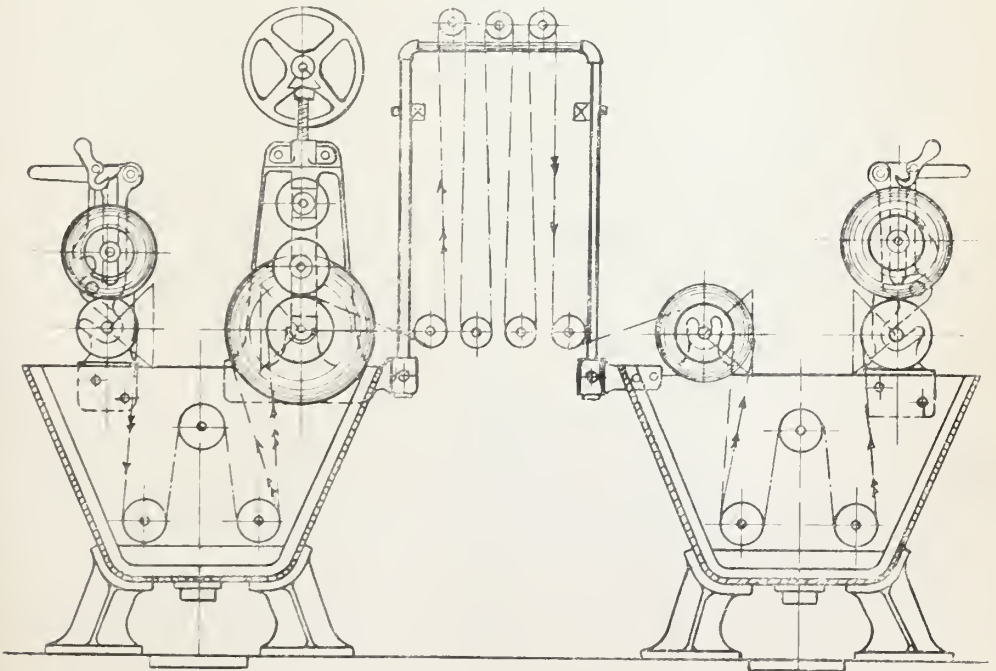
## Double Jigger for Immedial Colours

built by C. A. Gruschwitz, Olbersdorf near Zittau (Saxony).



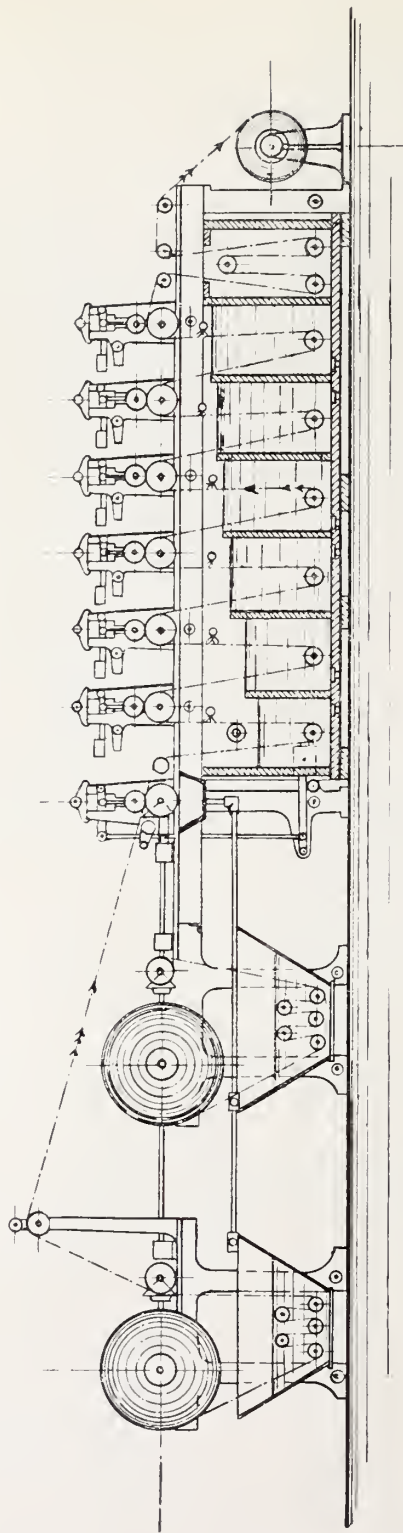
## Double Jigger with Oxidising Appliance for Immedial Indone

built by C. A. Gruschwitz, Olbersdorf near Zittau (Saxony).



## Jigger for Immedial Colours with Broad-Washing Machine

built by C. G. Haubold jun., G. m. b. H., Chemnitz (Saxony).



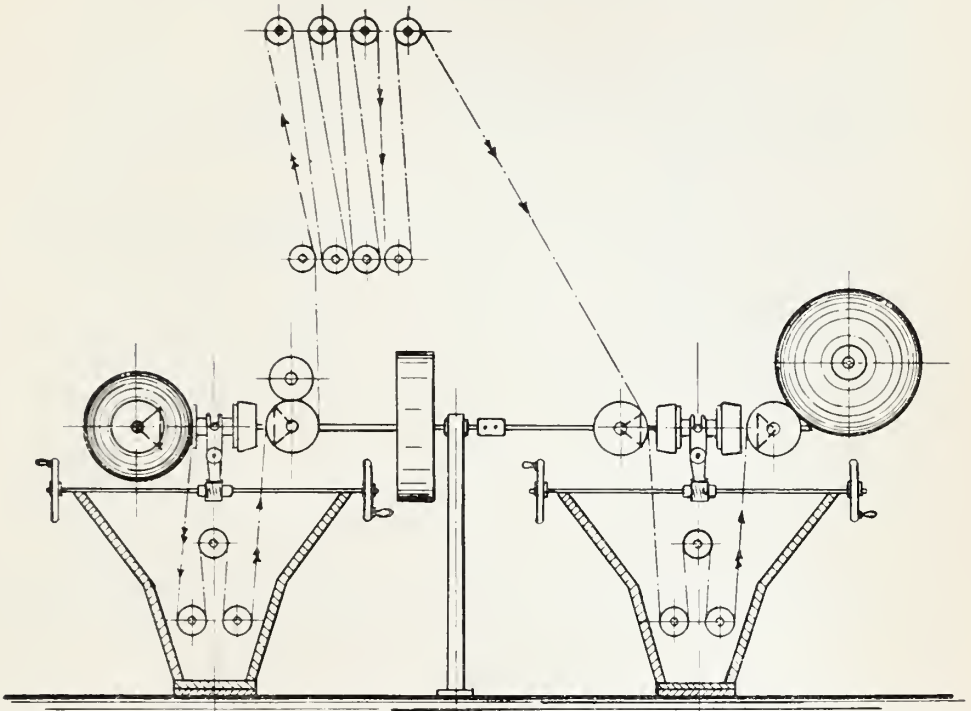
The dyeing is carried out in two jiggers placed side by side or one behind the other, as in the above sketch. After dyeing, the goods are run straight into the washing machine. The method of working may be so regulated that the goods coming from one and then from the other jigger are washed alternately.

Before entering the washing machine, the dyed goods pass a pair of squeezing rollers in order to be freed from the adhering liquor, which is made to run back into the jiggers; it is best however to have the nippers affixed to the jigger.

When dyeing Immedial Indone, the goods, after having been squeezed off, are given an air passage over some guiding rollers in order to oxidise, and only then are they rinsed.

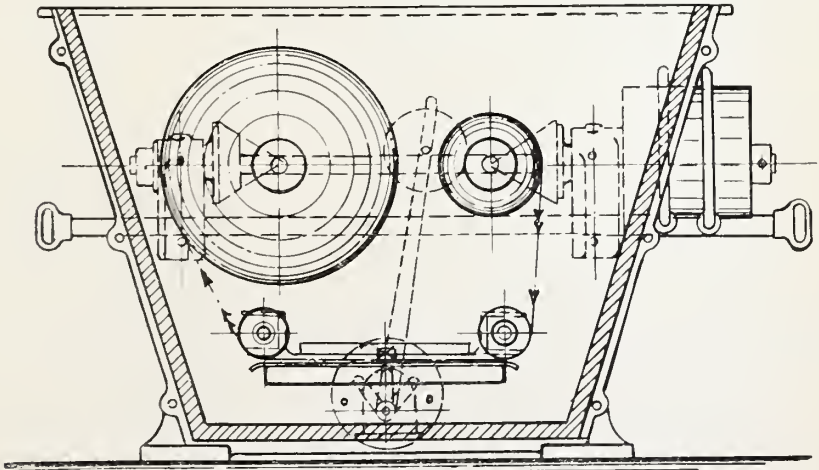
## Double Jigger with Oxidising Appliance

built by C. G. Haubold jun., G. m. b. H., Chemnitz (Saxony).



## Jigger for Dyeing below the Surface of the Liquor

built by C. G. Haubold jun., G. m. b. H., Chemnitz (Saxony).

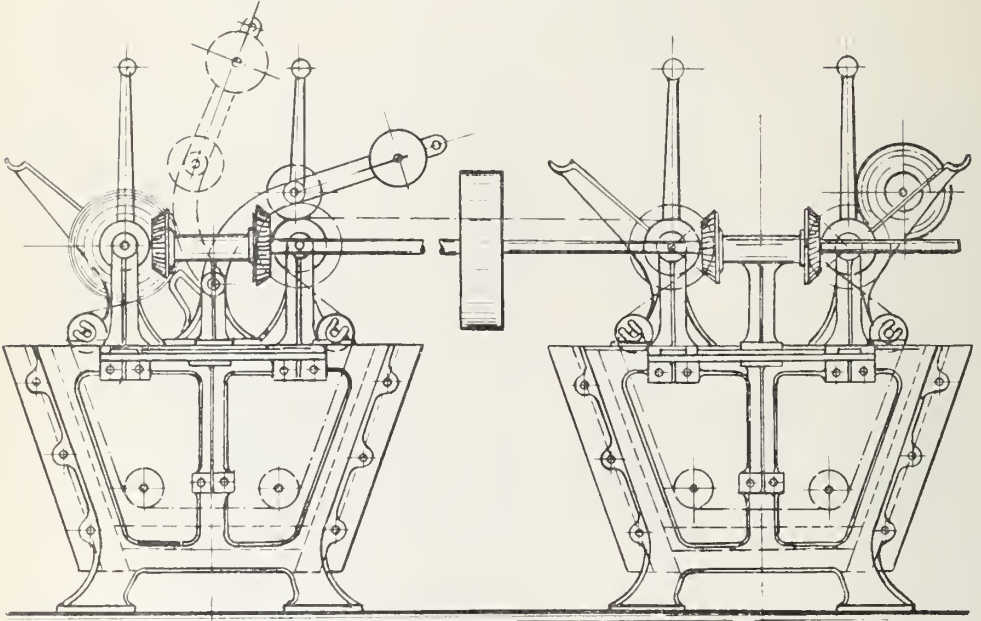


This jigger is as a rule likewise provided with an efficient squeezing arrangement.



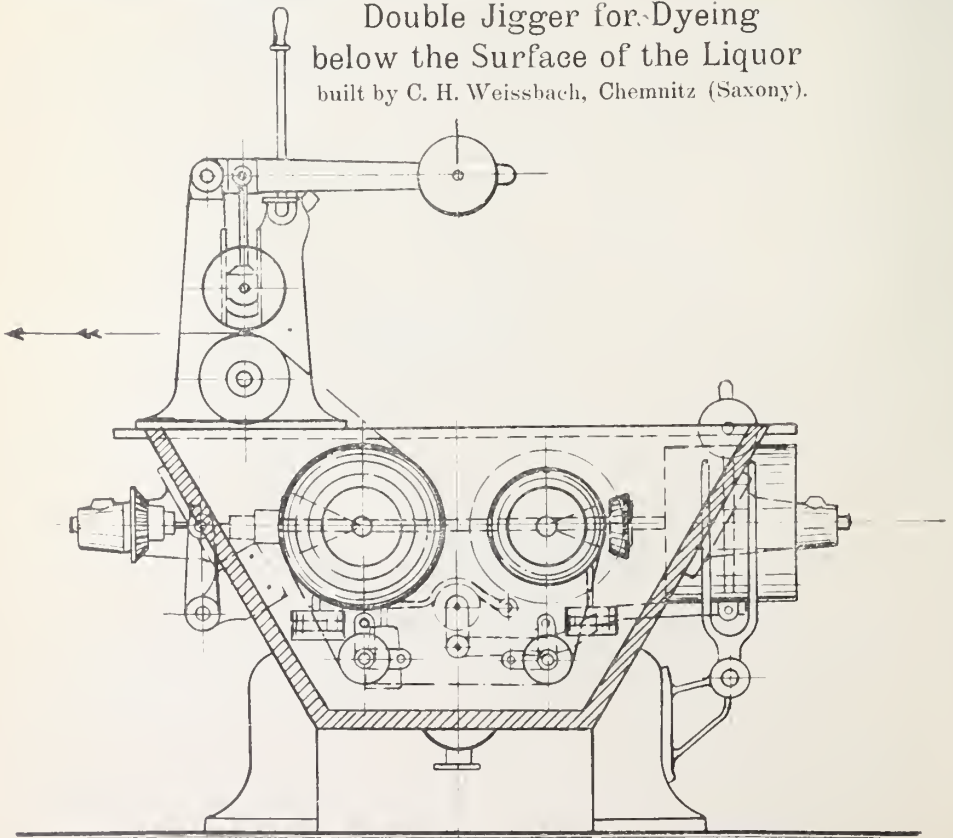
## Double Jigger for Immedial Colours

built by C. H. Weissbach, Chemnitz (Saxony).



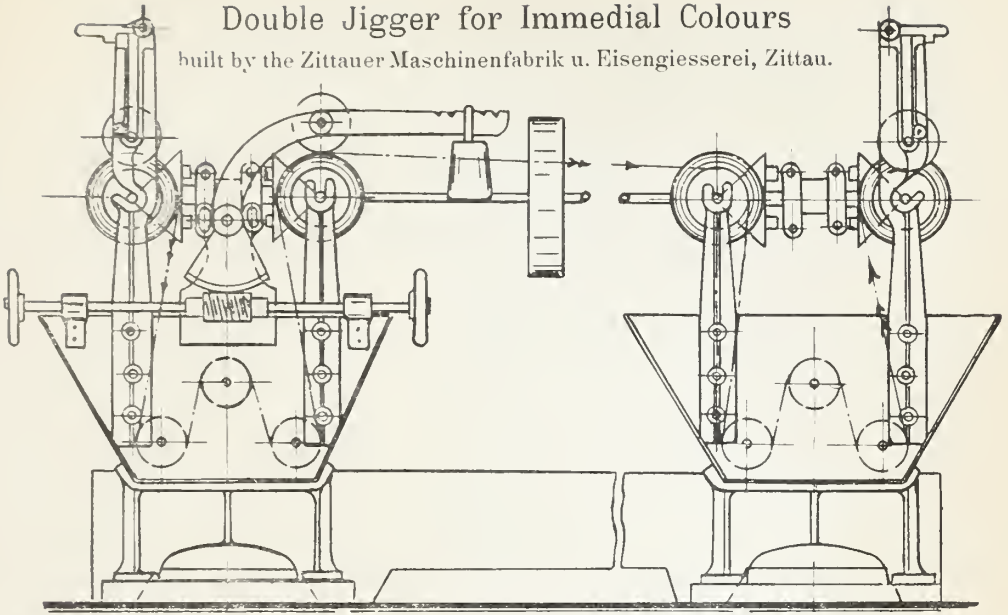
## Double Jigger for Dyeing below the Surface of the Liquor

built by C. H. Weissbach, Chemnitz (Saxony).



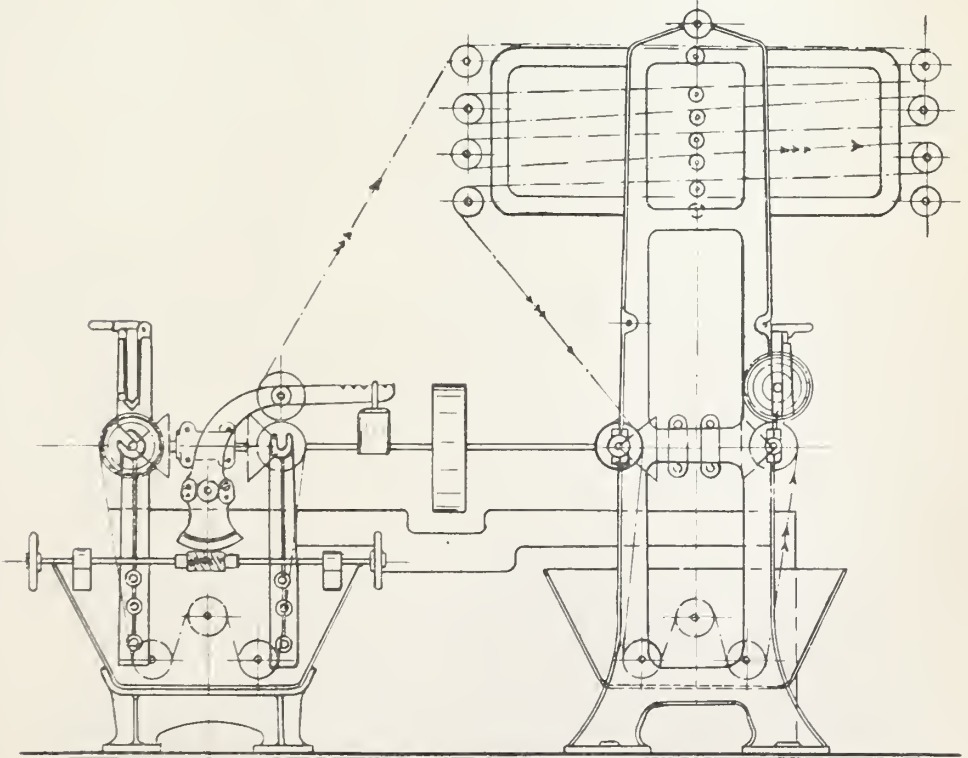
### Double Jigger for Immedial Colours

built by the Zittauer Maschinenfabrik u. Eisengiesserei, Zittau.



### Double Jigger with Oxidising Appliance for Immedial Indone

built by the Zittauer Maschinenfabrik und Eisengiesserei, Zittau.





**Immedial Indone 3B conc., B conc., BBF conc., BF conc., JBN conc.,  
BN conc., R conc., RR conc., RG conc., RB conc.**

	For pale and medium shades		For deep shades	
	Starting bath per 10 gallons liquor	Subsequent lots	Starting bath per 10 gallons liquor	Subsequent lots
Dyestuff	3 — 12 oz	—	$\frac{3}{4}$ — 1 $\frac{1}{2}$ lbs	—
Sodium sulphide crystals	$\frac{5}{8}$ — 2 lbs	—	2 — 3 $\frac{1}{2}$ „	—
Caustic soda lye of 75 deg. Tw.	1 $\frac{1}{2}$ — 3 oz	0,2—0,5 ‰	1 $\frac{1}{2}$ —3 oz	0,2— 0,5 ‰
Turkey-red oil	1 $\frac{1}{2}$ — 3 „	0,5—1 ‰	1 $\frac{1}{2}$ —3 „	0,5— 1 ‰
Common salt or desiccated Glauber's salt	3 oz — 1 lb	0 — 5 ‰	1 — 2 lbs	0 — 10 ‰
with a further addition of				
Dyestuff	1,5 — 4 ‰	1,5—4 ‰	4 — 8 ‰	4 — 8 ‰
Sodium sulphide crystals	3 — 8 ‰	3 — 8 ‰	8 — 16 ‰	8 — 16 ‰
calculated on the weight of the goods.				

Dye the boiled goods in a hot bath with 4—6 passages not longer than  $\frac{3}{4}$  hour, squeeze off thoroughly by means of the nippers, give an air passage of 10—20 yards, and rinse at once cold in a jigger kept ready at hand for this purpose.

When adding glucose (same weight as of dyestuff for the starting bath and  $\frac{1}{4}$ — $\frac{1}{5}$ th of its quantity for subsequent lots), Immedial Indone R conc., RR conc., RG conc., RB conc. and BF conc. yield fuller and redder shades.

Combinations of the Immedial Indone brands with Immedial Direct Blue are dyed in the same manner.

in the Jigger.

### Immedial Indogene GCL conc., B conc.

	For pale and medium shades		For deep shades	
	Starting bath per 10 gallons liquor	Subsequent lots	Starting bath per 10 gallons liquor	Subsequent lots
Dyestuff	3 — 12 oz	—	$\frac{3}{4}$ — $1\frac{1}{2}$ lbs	—
Sodium sulphide crystals	$\frac{5}{8}$ — 2 lbs	—	2 — $3\frac{1}{2}$ „	—
Caustic soda lye of 75 deg. Tw.	$1\frac{1}{2}$ — 3 oz	0,2 — 0,5 0/0	$1\frac{1}{2}$ — 3 oz	0,2 — 0,5 0/0
Turkey-red oil	$1\frac{1}{2}$ — 3 „	0,5 — 1 0/0	$1\frac{1}{2}$ — 3 „	0,5 — 1 0/0
Common salt or desiccated Glauber's salt	$\frac{1}{2}$ — 1 lb	0 — 5 0/0	1 — 2 lbs	0 — 10 0/0
with a further addition of				
Dyestuff	1,5 — 4 0/0	1,5 — 8 0/0	4 — 8 0/0	4 — 8 0/0
Sodium sulphide crystals	3 — 8 0/0	3 — 8 0/0	8 — 16 0/0	8 — 16 0/0
calculated on the weight of the goods.				

Dye the previously boiled goods in a hot bath with as few passages as possible, squeeze off, and rinse at once in cold water. An air passage is not absolutely necessary, but if applied, and likewise when dyed with the addition of glucose, both brands yield redder and fuller shades.

### Immedial Sky Blue Paste and Powder conc.

	For pale and medium shades		For deep shades	
	Starting bath per 10 gallons liquor	Subsequent lots	Starting bath per 10 gallons liquor	Subsequent lots
Immedial Sky Blue Paste	$\frac{3}{4}$ — $1\frac{1}{2}$ lbs	—	$1\frac{1}{2}$ — 3 lbs	—
Sodium sulphide crystals	8 — 12 oz	—	$\frac{3}{4}$ — 1 „	—
Soda ash	$4\frac{1}{2}$ „	1 0/0	$4\frac{1}{2}$ oz	1 0/0
Turkey-red oil	$1\frac{1}{2}$ — 3 „	0,5 — 1 0/0	$1\frac{1}{2}$ — 3 „	0,5 — 1 0/0
Common salt or desiccated Glauber's salt	1 — 2 lbs	0 — 5 0/0	2 — 3 lbs	5 — 10 0/0
with a further addition of				
Dyestuff	3 — 6 0/0	3 — 6 0/0	6 — 10 0/0	6 — 10 0/0
Sodium sulphide crystals	3 — 4 0/0	3 — 4 0/0	4 — 6 0/0	4 — 6 0/0
calculated on the weight of the goods.				

Dye the previously boiled goods at 50–60° C. (120–140 deg. F.) with as few passages as possible, squeeze off, and rinse.

Immedial Sky Blue Powder conc. is dyed like the paste product, but only half the quantity of dyestuff is required for producing the same depth of shade.

should be aftertreated with sulphate of copper and bichromate of potash (see page 18).

## Immedial Direct Blue B, R, JB, OD.

	For pale and medium shades		For deep shades	
	Starting bath per 10 gallons liquor	Subsequent lots	Starting bath per 10 gallons liquor	Subsequent lots
Dyestuff	6 oz — 1 lb	—	1 — 1 <sup>5</sup> / <sub>8</sub> lb	—
Sodium sulphide crystals	12 „ — 1 <sup>1</sup> / <sub>2</sub> „	—	1 <sup>1</sup> / <sub>2</sub> — 2 <sup>1</sup> / <sub>2</sub> lbs	—
Soda ash	4 <sup>1</sup> / <sub>2</sub> oz	1 0/0	4 <sup>1</sup> / <sub>2</sub> oz	1 0/0
Turkey-red oil	1 <sup>1</sup> / <sub>2</sub> „ — 3 „	0,5 — 1 0/0	1 <sup>1</sup> / <sub>2</sub> — 3 „	0,5 — 1 0/0
Common salt or desiccated Glauber's salt	3 „ — 16 „	0 — 5 0/0	1 — 2 lbs	0 — 10 0/0
with a further addition of				
Dyestuff	3 — 6 0/0	3 — 6 0/0	6 — 10 0/0	6 — 10 0/0
Sodium sulphide crystals	3 — 6 0/0	3 — 6 0/0	6 — 10 0/0	6 — 10 0/0
calculated on the weight of the goods.				

Dye the boiled off goods for  $\frac{3}{4}$ —1 hour at the boil, squeeze off, and rinse immediately in cold water.

Brighter shades are obtained by a short passage through the air or by soaping.

Immedial Direct Blue B extra conc. and JB extra conc. are dyed like the single strength brands except that only half the weight of dyestuff is required for an equal depth of shade as of the latter; the weights of the other ingredients remain the same.

in the Jigger.

### Immedial Blue C, CB, CR.

	For pale and medium shades		For deep shades	
	Starting bath per 10 gallons liquor	Subsequent lots	Starting bath per 10 gallons liquor	Subsequent lots
Dyestuff	1/2 - 1 lb	—	1 - 1 1/2 lb	—
Sodium sulphide crystals	1/2 - 1 „	—	1 - 1 1/2 „	—
Caustic soda lye of 75 deg. Tw.	1 1/2 „ - 3 oz	0,2 - 0,5 0/0	1 1/2 - 3 oz	0,2 - 0,5 0/0
Turkey-red oil	1 1/2 „ - 3 „	0,5 - 1 0/0	1 1/2 - 3 „	0,5 - 1 0/0
Common salt or desiccated Glauber's salt	3 oz - 1 lb	0 - 5 0/0	1 - 2 lbs	0 - 10 0/0
with a further addition of				
Dyestuff	5 - 8 0/0	5 - 8 0/0	8 - 15 0/0	8 - 15 0/0
Sodium sulphide crystals	5 - 8 0/0	5 - 8 0/0	8 - 15 0/0	8 - 15 0/0
calculated on the weight of the goods.				

Boil the goods, and dye at the boil for 3/4—1 hour; squeeze off, and develop, without rinsing, by steaming or smothering.

The methods usually followed are described on pages 129—131 and 340 of our book on "Cotton Dyeing".

Immedial Blue C extra conc., CB extra conc., and CR extra conc. are dyed like the single strength brands except that only half the quantity of dyestuff is required for the same depth of shade; the weights of the other ingredients remain the same.

### Immedial New Blue G conc.

	For pale and medium shades		For deep shades	
	Starting bath per 10 gallons liquor	Subsequent lots	Starting bath per 10 gallons liquor	Subsequent lots
Dyestuff	1/2 - 1 lb	—	1 - 1 1/2 lb	—
Sodium sulphide crystals	1 - 2 „	—	2 - 3 „	—
Caustic soda lye of 75 deg. Tw.	1 1/2 - 3 oz	0,2 - 0,5 0/0	1 1/2 - 3 oz	0,2 - 0,5 0/0
Turkey-red oil	1 1/2 - 3 „	0,5 - 1 0/0	1 1/2 - 3 „	0,5 - 1 0/0
Common salt or desiccated Glauber's salt	1 1/2 - 1 lb	0 - 5 0/0	1 - 2 lbs	0 - 10 0/0
with a further addition of				
Dyestuff	3 - 6 0/0	3 - 6 0/0	6 - 10 0/0	6 - 10 0/0
Sodium sulphide crystals	6 - 12 0/0	6 - 12 0/0	12 - 20 0/0	12 - 20 0/0
calculated on the weight of the goods.				

Immedial New Blue is dyed and developed exactly in the same manner as Immedial Blue, and is used more especially for shading the same. The development is frequently replaced by an aftertreatment with metallic salts, as mentioned below, whereby darker and more reddish shades of exceedingly good fastness to washing and light are obtained.

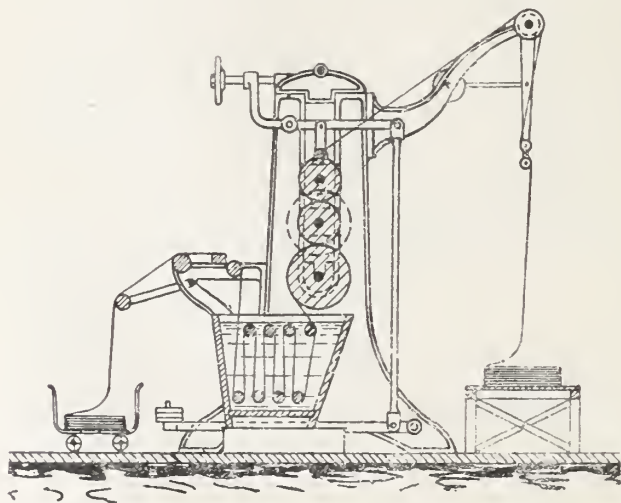
should be aftertreated with sulphate of copper and bichromate of potash (see page 18).

## b) Dyeing in the Padding Machine.

All kinds of padding machines may be used for padding the Immedial Colours, provided the squeezing rollers are not of copper or brass. Rollers of wood, iron or rubber are best suited for this purpose.

The padding trough or roller-box should be made of wood or iron; it should be of a good size and have a capacity of holding at least 25—50 gallons. The small guiding rollers inside the trough should be made either of iron entirely or of wood revolving in iron bearings. The rollers should be so adjusted that the material gets 4 to 5 turns and is all the time kept below the surface of the liquor.

The method of working is illustrated by the following sketch.



The trough is charged with

1	—6 lbs dyestuff,	} per 10 gallons liquor:
	twice the weight of sodium sulphide cryst. as of dyestuff,	
1 $\frac{1}{2}$ —3	oz caustic soda lye of 75° Tw. and	
3	.. Turkey-red oil	

dissolve the dyestuff together with sodium sulphide in hot water (see page 14) and add the Turkey-red oil last of all to the bath.

The goods which have been previously boiled are entered in a dry state into the padding machine and padded at a temperature of 50–70° C. (120–160 deg. F.). Indirect steam is best used for heating the bath. For replenishing the bath, fresh liquor containing exactly the same ingredients as the starting bath is added in proportion to the volume of liquor consumed.

Dyeings of Immedial Direct Blue and Immedial Indogene are given a short air passage and then immediately rinsed.

Dyeings of Immedial Indone are squeezed off evenly, given a long air passage, (10 to 20 yards), and then rinsed.

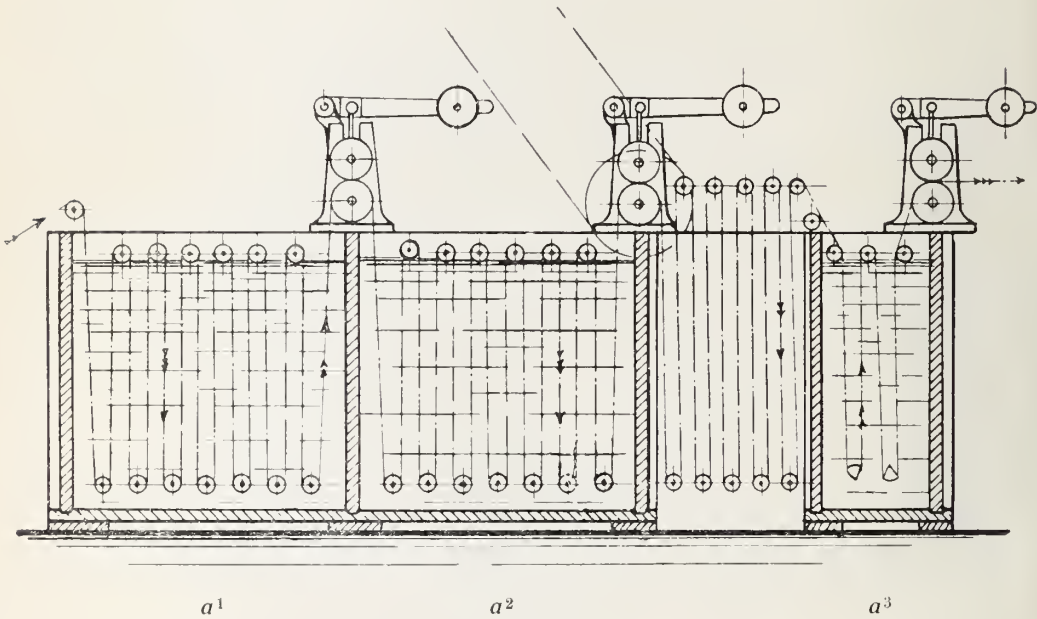
Dyeings of Immedial Blue and Immedial New Blue, instead of being rinsed after squeezing off, are squeezed off well in the same way as after dyeing in the jigger and then developed by steaming or smothering (see page 18).

Further particulars about working in the padding machine, as well as patterns, will be found in our pattern card No 2760, "Immedial Colours dyed in the Padding Machine".



### c) Dyeing in the Continue Machine.

The following sketch shows a good type of a continue machine which may be used for dyeing all kinds of blue shades.

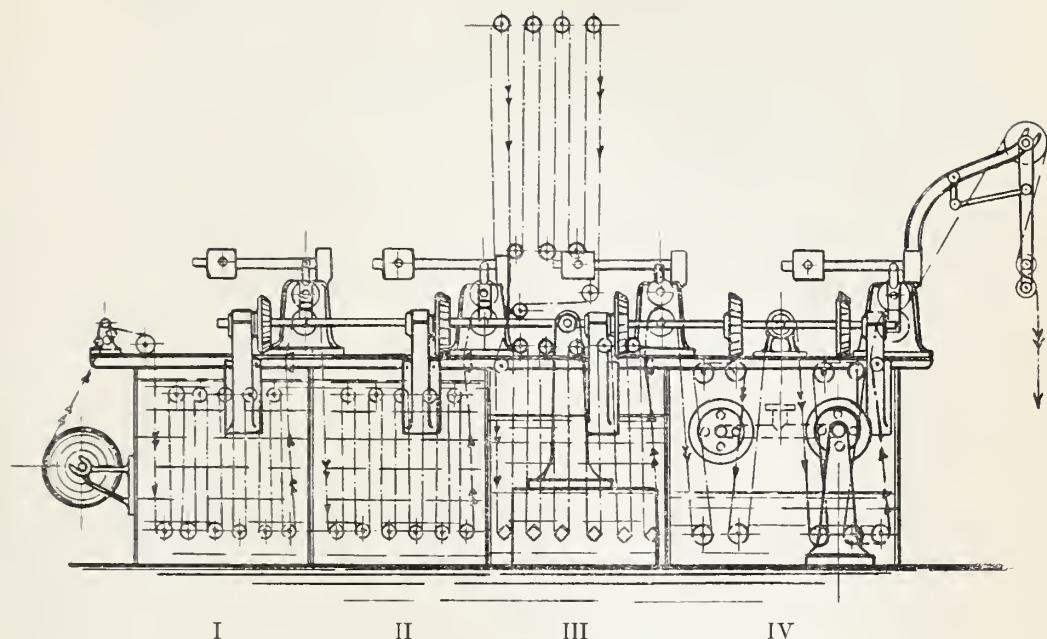


*a¹ and a² represent two large roller-boxes containing the dye-liquor, each of which is capable of holding 650—700 gallons. The partition wall between the two boxes is perforated to adjust the level of the liquor. Both boxes are provided with effective squeezing rollers, consisting either of iron covered well with cotton cloth, or, the upper one is coated with rubber and the lower one is of iron covered well with cloth. a³ represents a small wooden vat for rinsing. A system of guiding rollers is arranged between a² and a³ by which the squeezed off goods coming from the bath may be given a short or a long air passage as the case may demand.*

Openers are arranged at the entrance of the goods and before each pair of nippers in order to prevent creases forming.

The speed of the machine is so regulated as to dye 15—20 yards per minute, at which rate the day's production for a working day of 10 hours would amount to 10—12000 yards.

A continue machine of a similar construction is built by Fr. Gebauer, Berlin.



The two first vats contain the dye-liquor, and the third and fourth serve for the rinsing. When dyeing Immedial Indone, the pieces are conducted over a number of rollers fixed above the troughs, in order to oxidise.

The dye vats are charged with

8	— 24 oz dyestuff and the requisite quantity	per 10 gallons liquor.
	of sodium sulphide cryst. (p. 13)	
1 <sup>1</sup> / <sub>2</sub> — 3	„ caustic soda lye of 75° Tw. and	
8	— 24 „ common salt	

During the dyeing the bath is strengthened with

3	— 8 <sup>0</sup> / <sub>10</sub> dyestuff and the requisite quantity	reckoned on the weight of the goods.
	of sodium sulphide cryst. (p. 13)	
1 <sup>1</sup> / <sub>2</sub> — 1 <sup>0</sup> / <sub>10</sub>	caustic soda lye of 75° Tw.	

The goods are dyed by one or two passages at a temperature of 70—80° C (160—175 deg. F.); dark shades may be dyed if necessary in a boiling bath.

The pieces should be wetted out and then squeezed off well, before entering the bath. For pale shades the goods should be bleached previously, whereas for medium and dark shades boiling out before dyeing is sufficient.

With regard to the addition of glucose for Immedial Indone see page 86.

Dyeings of Immedial Direct Blue and Immedial Indogene are given a short air passage and then rinsed immediately.

Dyeings of Immedial Indone are squeezed off evenly and thoroughly, given a long air passage (10 to 20 yards), and then rinsed.

Dyeings of Immedial Blue and Immedial New Blue are not rinsed after squeezing off, but are squeezed off well in the same way as after dyeing in the jigger and then developed by steaming or smothering (see page 18).

### Topping with Basic Colours.

The topping of blue Immedial Colours with Basic Colours is best carried out in the jigger or in the padding machine.

The following Basic Colours serve principally for this purpose:

For blue shades:

New Methylene Blue GG, N, R and 3R  
Methylene Blue BB.

For reddish shades:

New Methylene Blue 3R  
Methyl Violet (all brands)  
Crystal Violet 10B.

For dark blue shades:

Naphtindone BB.

For topping, 2—4% acetic acid are best added to the bath and besides in the case of Naphtindone 3—4% sulphate of alumina. The goods are first given one or two passages in the bath charged with these ingredients, before adding gradually the well dissolved dyestuff; dyeing is commenced lukewarm, the temperature being raised later on to boiling point.

In the case of goods which are to be subjected to a finish, the Basic Colours are frequently added straight to the finishing size.

### Topping and Bottoming with Indigo.

Dyeings of Immedial Direct Blue and Immedial Blue produced in the manner described are especially well suited for topping with Indigo. It is not necessary to rinse the goods after dyeing, and the developing of Immedial Blue by steaming can likewise be omitted.

The topping with Indigo may be carried out at will either in the round vat or in the continuous indigo-dyeing machine with one or more passages.

The goods to be dyed with Immedial Colours are frequently also bottomed with Indigo.

They are first dyed with Indigo, acidulated, rinsed, and topped then in the usual manner with Immedial Colours.

In both cases the goods are frequently brightened with Basic Colours either by direct topping or by adding the latter to the size.

### Linen and Half-Linen.

As already mentioned on page 79, a jigger provided with arrangements for dyeing below the surface of the liquor has been introduced quite largely for the dyeing of linen goods in view of the fact that the dyeing process can be prolonged, thus facilitating also the penetration.

The method of dyeing is the same as when using an ordinary jigger. It is not altogether essential that the goods be covered entirely by the liquor, it being sufficient if the batching rolls are immersed only half or three-quarters in the liquor, which makes it also easier to see that the goods are running properly.

Linen goods require less dyestuff for dyeing than cotton materials, and the weights of common salt or Glauber's salt may likewise be reduced or omitted altogether. The penetration is facilitated by adding some Turkey-red oil (3—4½ oz per 10 gallons liquor).

It is not necessary to boil the goods before dyeing.

## Range of Indigo Shades.

The very extensive range of our Immedial Colours makes it possible to produce any of the characteristic Indigo shades, from the palest and brightest to the deepest Blues.

Immedial Indone 3B conc., BBF conc. and BF conc. as also Immedial Indogene GCL conc. are chiefly used for dyeing pale shades, whilst Immedial Indone BF conc. and R conc. saddened with Immedial Indogene B conc. or Immedial Direct Blue B or JB serve for medium shades. For deep shades, Immedial Indone R conc., RR conc. and RB conc. and Immedial Direct Blue JB in combination with Immedial Direct Blue B are used.

The customary Basic Colours serve for any subsequent shading necessary, and may either be added to the last rinsing bath, or, as is more frequent, to the finishing size.

The blues produced in this manner are much faster to rubbing than Indigo dyeings and are more and more supplanting Indigo.

No 1. 0,75 % Immedial Indogene GCL conc. pat.  
0,25 % Immedial Indone BF conc. pat.

No. 2 1 % Immedial Indogene GCL conc. pat  
0,6 % Immedial Indone BF conc. pat.  
0,05 % Immedial Direct Blue B pat.

No. 3. 0,75 % Immedial Indone 3B conc. pat.  
1,6 % Immedial Indone BF conc. pat.  
0,2 % Immedial Direct Blue B pat.

No. 4. 1,25 % Immedial Indone BBF conc. pat.  
3 % Immedial Indone BF conc. pat.  
0,75 % Immedial Direct Blue B pat.

No. 5. 2,5 % Immedial Indone BF conc. pat.  
3 % Immedial Indone R conc. pat.  
1,2 % Immedial Direct Blue B pat.

No. 6. 2,5 % Immedial Indone BF conc. pat.  
4 % Immedial Indone R conc. pat.  
1,8 % Immedial Direct Blue B pat.

No. 7. 2,5 % Immedial Indone BF conc. pat.  
4,5 % Immedial Indone R conc. pat.  
3,5 % Immedial Direct Blue B pat.

No. 8. 6 % Immedial Indone R conc. pat.  
2,5 % Immedial Indone RR conc. pat.  
4,5 % Immedial Direct Blue B pat.

topped with

0,2 % Naphtindone BB pat.

Range of Indigo Shades.

1



2



3



4



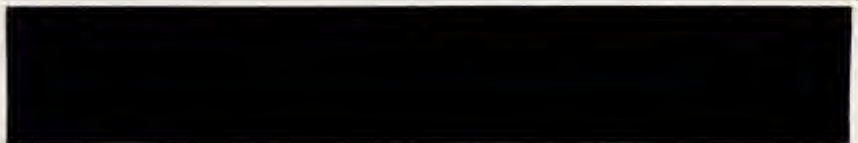
5



6



7



8





## Ticking, Muslin, Calico, Satteen, Moleskin, etc.

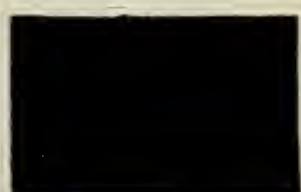
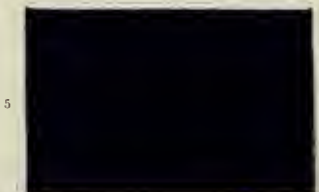
The blue Immedial Colours are excellently adapted for producing the greatest variety of fast blue shades on the above-mentioned materials which are chiefly used for clothing, aprons, workmen's overalls and also for trimmings and linings. Next to the blues which are dyed direct, such as Immedial Indone, Immedial Indogene and Immedial Direct Blue, the developed Immedial Blues, shaded if necessary with Immedial New Blue, are also applied extensively owing to their low cost. The developing is extremely simple and is mostly done by smothering or by steaming.

The combination of Immedial Colours and Indigo likewise deserves special consideration; the goods are first bottomed with Immedial Blue or Immedial Direct Blue and then topped in the round vat or in the continuous indigo-dyeing machine, or they are first dyed with Indigo and then topped with Immedial Indone or Immedial Indogene, in order to ensure better levelness and resistance to rubbing and to effect a saving in Indigo.

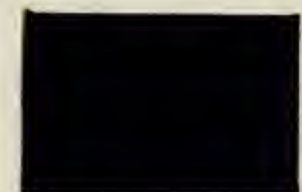
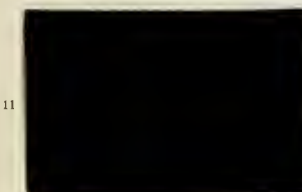
A shading with Basic Colours may in all cases be resorted to, if desirable, without affecting the fastness. The fastness can be improved by a treatment in the customary manner with metallic salts (see page 18).

- |    |     |     |   |  |
|----|-----|-----|---|--|
| No | 1.  | 3   | % | Immedial Indogene GCL conc. pat.   |
| No | 2.  | 9   | % | Immedial Blue CB pat., developed,<br>topped with<br>0,2 % New Methylene Blue N.  |
| No | 3.  | 5   | % | Immedial Indone BBF conc. pat.<br>0,8 % Immedial Direct Blue B pat.  |
| No | 4.  | 4   | % | Immedial Indone BF conc. pat.<br>1,5 % Immedial Direct Blue JB pat.<br>1,5 % Immedial Deep Green G.  |
| No | 5.  | 5   | % | Immedial Indone RB conc. pat.  |
| No | 6.  | 5   | % | Immedial Indone R conc. pat.<br>2 % Immedial Indone RR conc. pat.  |
| No | 7.  | 7   | % | Immedial Direct Blue JB pat.<br>aftertreated with<br>bichromate of potash and sulphate of<br>topped with [copper;<br>0,2 % Naphtindone BB pat.       |
| No | 8.  | 7   | % | Immedial Indone RG conc. pat.  |
| No | 9.  | 4   | % | Immedial Indogene GCL conc. pat.<br>on an Indigo bottom.   |
| No | 10. | 10  | % | Immedial Blue CR pat., developed.  |
| No | 11. | 7,5 | % | Immedial Direct Blue B pat.  |
| No | 12. | 6   | % | Immedial Blue CB pat.<br>topped with Indigo.   |
| No | 13. | 7   | % | Immedial Direct Blue B pat.<br>aftertreated with<br>bichromate of potash and sulphate of<br>topped with [copper;<br>0,2 % New Methylene Blue GG pat. |
| No | 14. | 3   | % | Immedial Indogene B conc. pat.   |
|    |     | 4   | % | Immedial New Blue G conc. pat.<br>aftertreated with<br>bichromate of potash and sulphate of<br>[copper.  |
| No | 15. | 7   | % | Immedial New Blue G conc. pat.<br>aftertreated with<br>bichromate of potash and sulphate of<br>[copper   |
| No | 16. | 6   | % | Immedial Direct Blue B pat.<br>topped with Indigo.   |

Ticking, Muslin, Calico, Satteen, Moleskin, etc.



Ticking, Muslin, Calico, Satteen, Moleskin, etc.



### Worstedes and Velveteens.

For imitation worsteds, and more especially velveteens, the blue Immedial Colours are most extensively applied owing to their leaving intact the original softness of the goods, and, in addition to an excellent fastness to wearing and light, yielding dyeings very fast to rubbing, which may be brought to any desired shade by a slight topping with Basic Colours. Velveteens dyed with Immedial Colours are frequently finished in the customary manner with Prussian Blue as varnish colour.

- No 17. 4,5 % Immedial Indone RG conc. pat.  
2 % Immedial Indone RR conc. pat.
- No 18. 6 % Immedial Direct Blue B pat.  
topped with  
0,1 % New Methylene Blue N.
- No 19. 8 % Immedial Direct Blue R pat.  
1,5 % Immedial Black NR  
topped with  
0,1 % New Methylene Blue R pat.
- No 20. 3 % Immedial New Blue G conc. pat.  
4 % Immedial Indogene B conc. pat.  
aftertreated with  
bichromate of potash and sulphate of copper.
- No 21. 8 % Immedial Blue CB pat., developed  
(finished with Prussian Blue).
- No 22. 3 % Immedial Blue CB pat.  
4 % Immedial New Blue G conc. pat. } developed,  
topped with  
0,1 % New Methylene Blue GG pat.
- No 23. 6 % Immedial Direct Blue B pat.  
topped with  
0,25 % Methylene Blue BB.
- No 24. 6 % Immedial Indogene B conc. pat.  
topped with  
0,2 % New Methylene Blue GG pat.

Worsteded and Velveteens.

17



18



19



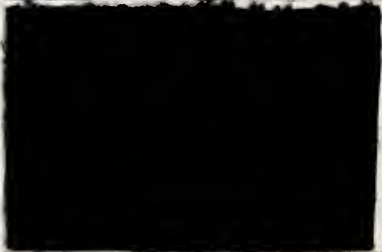
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23



24



## Linen and Half-Linen.

For this line of goods the Immedial Colours offer over Indigo the great advantage of a far better penetration and a superior fastness. Owing to these excellent properties the Immedial Blues have already been adopted by various countries for dyeing military cloth.

Like cotton goods, linens also are frequently dyed with Immedial Colours in combination with Indigo by being bottomed or topped with the latter. In both cases the cost of such dyeings compares very favourably with that of pure Indigo dyeings.

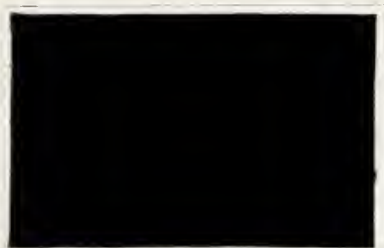
Linen and half-linen goods are dyed with advantage in a jigger adapted for dyeing below the surface of the liquor.

- |        |     |  |
|--------|-----|--|
| No 25. |     | Immedial Indone R conc. pat.<br>aftertreated with<br>bichromate of potash and sulphate of copper<br><u>(Linen for the Belgian War Office).</u> |
| No 26. | 3   | 0/0 Immedial Indone BN conc. pat. (on bleached material).  |
| No 27. | 2,5 | 0/0 Immedial Indone 3B pat.  |
|        | 4,5 | 0/0 Immedial Direct Blue JB pat.   |
| No 28. | 4   | 0/0 Immedial Direct Blue B pat.<br>topped with Indigo.   |
| No 29. | 4   | 0/0 Immedial Indone R conc. pat.   |
|        | 3   | 0/0 Immedial Direct Blue B pat.<br>topped with<br>0,2 0/0 Naphtindone BB pat.<br>0,15 0/0 New Methylene Blue 3R pat.                           |
| No 30. | 4   | 0/0 Immedial Direct Blue B pat.  |
|        | 2   | 0/0 Immedial Indone R conc. pat.   |
| No 31. | 4   | 0/0 Immedial New Blue G conc. }  |
|        | 2   | 0/0 Immedial Blue CR pat. } developed.   |
| No 32. | 5   | 0 0 Immedial Indogene B pat.   |
|        | 2,5 | 0/0 Immedial Indogene GCL pat.<br>aftertreated with<br>bichromate of potash and sulphate of copper.  |

Linen and Half-Linen.

Linen.

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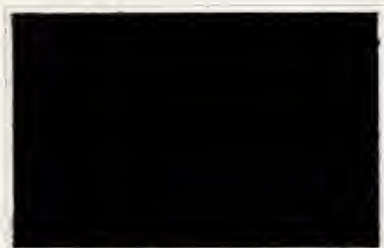
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Half-Linen.

31



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Without guarantee.





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